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# USSR Report

ENERGY

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13 July 1984

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Kiev UGOL' UKRAINY in Russian No 2 (326), Feb 84 pp 5-8

[Article by V.A. Dubodelov, engineer, Ukrainian SSR Ministry of the Coal Industry, and Yu.M. Rozenshteyn, engineer, Central Standards Research Station, Ukrainian SSR Ministry of the Coal Industry: "Measures to Increase Labor Productivity at Progressive Mines in the Donbass"]

[Text] Despite an increase in the depth of the workings, deterioration of the geological mining conditions, and increasing complexity in the transportation and ventilation systems, almost 100 mines in the Donbass [Donets Coal Basin] increased labor productivity in 1983 in comparison with 1982. The measures that are being implemented to increase labor productivity are aimed at timely preparation of the line of working faces, a reduction in the labor-intensiveness of production processes, an improvement in the quality of maintenance work and equipment repair, and the strengthening of labor and technological discipline.

At the Donetskugol' association's Mine imeni Gor'kiy, timely preparation of the working faces has been achieved by the introduction and efficient utilization of new shaft-cutting equipment. GPK combines and 2PNB-2 and 1PPN-5 rock-loading machines are being used successfully for cutting work. The level of combine cutting of shafts is about 50 percent. Faces that are being prepared are supplied with a ceaseless flow of materials. Intramine transport is operating rhythmically in connection with an improvement in the traffic capacity of the technological rock complex on the surface. In order to improve the state of the underground workings and reduce the labor-intensiveness of support work, their cross-sectional area has been increased and timber spacing has been reduced from 1 to 0.5-0.8 m.

A section for repair and restoration work has been organized for the timely and high-quality repair of workings. Metal timbering elements that are removed from abandoned workings are straightened on three presses, two of which are installed in the mine. A cutting-wedge machine has been introduced in order to mechanize the ripping up of soil when workings are being repaired. The control of conveyor lines for sectional and general mine use, planing units and partial ventilation blowers has been automated.

The measures that have been implemented contributed to increase in the number of working faces actually being worked, the introduction of progressive mining

systems, and the timely preparation of reserve longwalls. Although there was a reduction in the average dynamic thickness of a bed from 0.98 to 0.78 m in this mine, the average daily extraction of coal increased by 11.5 percent in 1983 in comparison with 1982. The use of planing units on longwalls with thin beds played an important role in the solution of this problem.

Labor discipline was strengthened significantly at the mine, absenteeism of working face workers and cutters declined, early departure from working places was not allowed, and cadre instability was reduced significantly. The workers' labor productivity for coal extraction increased 6.2 percent in 1983 as opposed to 1982. The mine's collective fulfilled the plan for the first 3 years of the five-year plan ahead of time, on 2 July 1983, and fulfilled the 1983 plan on 23 September.

At the Sovetskugol' association's "Yasinovskoye" sh/u [Mine Administration], two entry-driving machines, nine rock-loading machines, three "Titan-1" timber-installing complexes and three BUE-1 drilling units are being used efficiently for preparatory work. The level of mechanized preparatory work is about 80 percent (62.8 percent in 1982). At 5 of the 13 active working faces, coal is being extracted by LKMK-97D complexes with LK-101 combines, UST-2m planing units are being used on 2 longwalls, and LK-101 narrow-wedge combines with a "Sputnik" hydraulically stabilized adjustable timber are being used on 6 of them.

From the longwall loading points the coal is transported by LLT-80 and KLA-250 belt conveyors, whereas LLU-100, LL-100 and KLA-250 conveyors are used for sloping workings. Cargo is delivered along haulage drifts by AM-8 and 2AM-8 battery-powered electric locomotives. The ripping up of soil during the repair of workings has been mechanized. In the intramine transport section, 15 crews of electric locomotive, dumper and underground equipment operators have been organized from among the underground workers, who have a piece-rate wage scale, which facilitated better organization of the process of supplying the faces with empty cars, materials and equipment.

In order to prevent air leakage and improve ventilation, the ventilation bulk-heads are being covered with a plaster solution. The AKV-2P equipment has been replaced with the new "Azot" type. The "Veter" equipment has been introduced at nine faces that are being prepared.

In order to increase the traffic capacity of the surface production complex and the underground installations, the capacity of the skips has been enlarged and the belts in the feeders and conveyors that carry the coal into the railroad bunkers have been replaced. During the winter, the coal in them is heated by a radiator unit. Special winches for moving loads during the repair and replacement of equipment in the shafts have been installed in the mine's working levels. Direct communication between the operators of underground equipment and the sorting machinery has been realized. The cleaning of the mine cars has been mechanized.

A section for the repair of mining equipment has been organized in this mining administration. Group preventive inspections of equipment in the sections and at the faces is being carried out according to approved schedules. Emulsion

and lubricating materials are delivered to the mine in sealed cars with partitioning hatches and discharge cocks. In 1982, 357 innovative suggestions from 320 people were introduced in the mining administration.

The crew of working face miners led by A.I. Yaroshenko is working stably. In 1982 it extracted 38,000 t of coal more than its plan called for. The crew worked on the longwall of Bay No 10 of the eastern slope, extracting coal from the  $\ell_6$  bed (thickness--0.9 m; angle of incidence--2-6°). The bed's immediate roof is sandy-clay laminated shale (up to 6.2 m thick) of average stability and the main roof is laminated, fissured, medium-grain sandstone (3-5.2 m thick). The bed's soil is sandy shale of medium strength (12 m thick). When the roof is made to cave in, water is discharged. The longwall, which is 200 m long, was worked by the pillar system under bed conditions that were hazardous because of sudden outbreaks of methane and dust explosions.

The possibility of the appearance of an outbreak was predicted with the help of long blastholes that were drilled ahead of the crew. A row of chocks made of posts 1.2 m long was laid out beneath the ventilation and above the haulage shafts and an organpipe supporting structure was put in place. The coal was extracted by a KMK-97 complex, in accordance with the shuttle system, using a plow to strip the face. The longwall sections opposite the recesses were reinforced with hydraulic stabilizers under a wooden beam 3.5 m long. The distance between the frames was 0.9 m, and between the posts in the frame it was 0.8 m. OKU-03 posts spaced 1.6 m apart were used as adjustable timbers in the section opposite the upper recess. Both the lower recess (5 m long) and the upper one (11 m) were mined with pick-hammers.

The combine operator, his assistant, 8-10 working face miners and the duty electric welder worked on the longwall during a mining shift. On a repair and preparation shift, the combine operator, his assistant, nine miners and seven electric welders carried out preventive inspections and repair machines and mechanisms and prepared the longwall for stoping. A lightened plow on the combine and a special frame with two hydraulic jacks (to move the heads of the face conveyor) were used on the longwall.

In 1983, A.I. Yaroshenko's crew worked the first eastern longwall (176 m long) in the  $\ell_6$  bed, which is 0.86 m thick. Using a LKMK-97D complex, the crew achieved a daily production load of 751 t, which resulted in a monthly labor productivity figure of 252.5 t per crew member. The stripping of the coal beyond the combine has been mechanized with the help of small loading plows that were installed on the conveyor, and the reinforcement of the rear MK-97D supports has been strengthened as the result of connecting the section's roof timbers to the posts of the scraper chain. The heads of the SP-63 longwall conveyor protrude partially into the adjacent workings, which made it possible to reduce the length of the lower recess to 2 m and that of the upper recess to 7 m. A PTK scraper-type reloader was used in the haulage drift in combination with KLA-250 and LLT-80 conveyors; this reduced the labor-intensiveness of the work done to maintain the loading point. On the airway there was a dirt-floored cableway for the delivery of equipment and materials to the longwall.

In 1982, the "Yasinovskoye" sh/u's collective extracted 73,100 t of coal more than was planned and provided an increase in labor productivity of 6.4 percent

in comparison with 1981. In 1983, labor productivity was 8.3 percent higher than in 1982.

Under complicated conditions (steeply sloping beds) at the Artemugol' associations Mine imeni Rumyantsev, a GPK entry-driving machine, PPN-5e rock-loading machines and BU-1 drilling units are being used effectively to prepare faces. In 1982, N.S. Krasnobryzh's crew cut 1,463 m of workings, as opposed to the planned 1,370 m. The monthly labor productivity figure was 10 m per cutter. The crew cut a haulage drift along the Mazurka bed (thickness--0.8-1.1 m; angle of incidence--54-56°). The roof was strong sandstone (7.8 m thick) and the soil was sandy shale (1.2 m thick) of average stability. The drift's cross-sectional area is 10.9 m<sup>2</sup> unfinished and 8.5 m<sup>2</sup> finished. The rock was cut by the drilling-and-blasting method and the coal was mined with pick-hammers. The drift was reinforced with AP-9.2 metal arches, which were made of specially shaped SVP-19, that were put in place 1 m apart. Three pipes that were mounted on special brackets and covered with a movable floor made of sawn wood were used as temporary timbering.

The cycle began with ventilation, bringing the face to a safe state and inspection and preparation of the equipment. The cutters then moved the temporary timbering forward and began to load the rock mass. Empty cars were moved onto a temporary siding consisting of three sections of rails that were each 8 m long and had cover-type connecting tongues. One cutter controlled the loading machine and another made sure the rock in the wagon was level. A wagon was loaded in 2-2.5 min, removal of the rock mass took 1 h, the erection of the permanent timbers took 40 min, and the laying of the temporary railway occupied 20 min. After that, one cutter mined coal for 1 h, using a pick-hammer, and another one threw the coal away from the face.

Two cutters drilled blastholes for 1.5 h (15 blastholes 38-42 mm in diameter and 1.8 m deep), using PR-27LB hammers with pneumatic dollies. After the drilling, the previously hammered-off coal was loaded for 15 min, the loading machine moved away from the face, and the tools were removed. Electric detonators with a short delay were used to detonate the charges. The face was ventilated with a VMP-6 blower. The cycle was repeated on the next shift.

Metal timbering elements and materials were delivered to the face on the first shift. Permanent railway sections that were 8 m long were laid in 1.5 days, and the ventilation and water drainage pipes were put in place in 1 day. In 1983 the crew drove about 1,700 m of haulage drift as the 970-m level, as opposed to the planned figure of 1,510 m.

A.P. Petrov's crew, which is working under the crew-contracting method, is driving preparatory workings at the rate of more than 120 m per month. Despite an increase in the cross-sectional area of the stripping preparatory workings and an increase in the proportion of field workings in the total cutting volume, the average monthly cutting rate at the Mine imeni Rumyantsev increased 4.7 percent in 1983 as opposed to 1981, the total amount of workings cut increased by 8.5 percent, and the labor-intensiveness of the cutting work was reduced by 9.4 percent. As a result, the timely preparation of the needed line of working faces is firmly guaranteed, blind longwalls are being converted to



a columnar one, with others changing over to a combined working system, and there is a rational order for working beds that are dangerous from the viewpoint of mine shocks and sudden outbreaks of coal, rock and gas. The Pugachevka bed, in which there is a danger of outbreaks, is being worked safely, with advancement of the extraction work to a stage that has made it possible to improve the safety of the mining work and increase the production load.

The introduction of heading units for the working of steeply sloping beds made it possible to raise the level of complexly mechanized coal extraction to 46 percent in 1983. While maintaining the number of workers at the 1981 level, average daily coal extraction at the mine increased by 10.6 percent.

Innovators at the mine pay a great deal of attention to improving the reliability of the ANShch heading units. The aggressive mine waters destroy the threads of the bolts used to fasten the boards of the conveyor support beams. Innovators N.V. Boyev, Ye.V. Boyev and I.F. Mikhaylovskiy designed a special tool for removing worn-out locking bolts. Innovators V.I. Zavgorodniy and S.V. Oler suggested a device that increases the service life of section supports and reduces labor costs for their removal.

In comparison with the 1982 level, labor productivity at the Mine imeni Rumyantsev rose by 3.6 percent in 1983.

At the Shakhterskantratsit association's "Postinkovskoye" sh/u, a scraper unit that was developed and manufactured by that enterprise's innovators was used to mechanize the loading of the rock mass when driving sloping workings. This made it possible to reduce manual labor costs and increase the rate at which workings are driven and the cutters' labor productivity. The introduction of a conveyor unit for the transportation of the rock mass from Level 17 to Level 15 at Mine No 20, which belongs to the mine administration, insured a rhythmic supply of empty cars for the cutting crews.

The "Postinovskoye" sh/u is developing sloping beds that are 0.7-1 m thick. The specialists in this mine administration were re-equipped with LK-101 combines for working the bed soil; they are being used successfully on four longwalls (the bed's angle of incidence is 30°). The reverse method is being used to work 50 percent of the active longwalls.

A pitch-bunker was used to work the fifth western longwall of the  $h_2^1$  bed; this eliminated idle time at the working face because of shutdowns in the intramine transport system. Workings are being repaired on a timely basis, and the metal timbers are removed when a working is abandoned and then reused.

The introduction of a VTs-3.5 unit in a ventilation hole 2.3 m in diameter made it possible to improve the ventilation of the workings. A KPSH-90 portable mine air conditioner has been put into operation at Mine No 20. A group of highly qualified fitters from the power and mechanical service are carrying out preventive repair of the extraction sections' mining equipment according to the schedule. The work that was done made it possible to halve the idle time at the longwalls in 1983 in comparison with 1982, increase the mine administration's average daily coal production by 13 percent, and reduce the production

cost for extracted fuel by 2.6 percent. Labor productivity rose 7.3 percent in 1983 as opposed to 1982.

At the Shakhterskantratsit association's "Shakhterskoye" sh/u, cutting crews have been enlarged and preparatory work concentrated in order to insure the timely preparation of new longwalls. The required amount of work is being done by two cutting crews, each of which is driving about 200 m of workings every month.

The mechanized delivery of people along the main slope has been organized from Level 5 to Level 10; this made it possible to reduce by 30 min the amount of time required to move the workers to the faces. The main workings have been retimbered, with the cross-sectional area being enlarged. The replacement of a BM2500 lifting machine with a Ts2.5 x 2 machine accelerated the lowering of materials and equipment into the mine. These measures insured the timely introduction into production of new levels and working faces.

In 1982, 118 innovative suggestions with an economic effect of 197,300 rubles were introduced. The use of a flangeless connection between the end gate valve and the pipeline reduced the working time when setting up a fire protection partition from 1.5 h to 10 min. The building of a machine for flushing electric locomotive batteries made it possible to do this work directly in the mine. In 1982, labor productivity increased by 11.7 percent in comparison with 1981, and in 1983 it increased by 4.1 percent in comparison with 1982.

At the Shakhterskantratsit association's "Vinnitskaya" Mine, GPK-1s combines and rock-loading machines with attached equipment for drilling blastholes were being used effectively to drive preparatory workings. In 31 working days in 1983, the crew of cutters led by N.G. Matveyev drove 1,011 m of workings. The monthly labor productivity per worker was 10 m. The crew's collective used two GPK combines with strengthened actuating members and end-type reloaders. The preparatory workings were braced with rectangular KPS timbers. Rock mass output to the surface is now done completely by conveyor, with a corresponding increase in the traffic capacity of the rock production complex.

All the longwalls have been equipped with mechanized complexes and are being worked with columns along the rise. In order to reduce the labor-intensiveness of the work and reduce the amount of time needed for final operations, the longwall conveyors' heads are placed along the footways, which made it possible to reduce the recesses' length to 1.5-1.6 m. Movable loading points have been introduced under the longwalls; this eliminates the intermediate drag conveyor when coal is reloaded from the longwall onto the belt conveyors. When repair and preventive work is being done in the extraction sections, electric fitters from the mine's power and mechanical service participate in addition to the sections' working face miners and electric fitters. There are lessons in mining technology for the electric fitters every week.

In order to insure more rhythmic work at the longwalls, storage bunkers with a capacity of 20-50 m<sup>3</sup> have been built in the sections. Automatic protection against gas has been introduced at all the longwalls and blind workings. The machine time for operating the combines was 63 percent, and the average daily production load was 878 t.

Labor productivity at the mine increased 11.7 percent in 1982 and 12.3 percent in 1983 (in comparison with the 1981 and 1982 levels, respectively). The coal extraction plan for the first 3 years of the five-year plan was fulfilled on 1 July 1983, and the plan for 1983 was fulfilled on 4 October.

At the Torezantratsit association's "Progress" Mine, two 4PP-2 entry-driving machines and a 2PNB-2 rock-loading machine were added. Instead of SP-63 and SR-70 drag conveyors, 1LT-80 belt conveyors were used to transport the rock mass during the driving of preparatory workings. All the working faces are being prepared for work by the reverse method with columns along the rise or the strike. Two-combine coal extraction has been used at two longwalls; this made it possible to eliminate the upper recess and reduce the length of the lower recess from 7 to 2 m.

A.G. Baranov's crew of working face miners is working a longwall that is equipped with a KM-88 complex and is producing up to 1,500 t of coal per day. Frontal deployment of the workers is used at the longwall; this insures a high combine operating speed. Each worker carries out all the production cycle processes at his assigned longwall section and monitors the technical status of the mechanized timbering, conveyor and hydraulic jacks.

An emergency with the belt conveyor on the side walkway, caused by twisting of the conveyor line as the result of intensive heaving of the soil in the working, slowed down the rhythmic work at the longwall. Belt conveyors have begun to be suspended from the timbers by cables, which has eliminated the need for raising the conveyor when the soil is ripped up, reduced the labor-intensiveness of picking up spilled coal from the walkway, and eliminated the placement of lumber on the ground under a conveyor to act as flooring.

In order to improve the state of the workings and reduce the labor-intensiveness of the work done to maintain them, the cross-sectional area was increased from 11 to 13 m<sup>2</sup> and main workings are being driven only through dead rock. A special machine has been introduced in order to rip up the soil that slopes toward the upheaval. In comparison with the 1981 level, the daily production load almost doubled and was 667 t, although thin beds were being worked.

Labor productivity at the mine increased by 9.5 percent in 1982, and in 1983 the increase was 31.3 percent (in comparison with the 1981 and 1982 indicators). The coal extraction plan for the first 3 years of the five-year plan was fulfilled on 21 October 1983.

Thanks to the rapid driving of preparatory workings with the help of 1PNB-2 and 1PPN-5 rock-loading machines, all the working faces at the Torezantratsit association's "Miuskaya" Mine have been converted to the column system of development. The cutting crew led by V.I. Boyko achieved an average monthly rate of 230 m because of its use of conveyor transport, the organization of a repair branch and a special delivery and rigging crew, and repair preventive inspection of the equipment on each shift by the duty electrical fitter.

Considerable attention is given to improving the operation of the "Donbass," KMK-97 and 1KM-103 mechanized complexes. In order to reduce the duration of

technological interruptions and the labor-intensiveness of the work at the longwalls, a unidirectional plan for mining coal, which increased the combine feed speed by 10 percent, has been adopted. The length of the recesses has been reduced at four longwalls as the result of removal of the conveyors' driving heads to adjacent workings. At two longwalls, recesses have been eliminated in connection with the use of two-combine mining and oblique arrivals at the end sections of the longwall. Inspection and repair of all the equipment, with the help of workers from the power and mechanical service, is carried out in the sections four times a week.

In order to improve the supply of empty cars for the working and preparatory faces, the routes have been relaid, with heavy rails, in the roadways of the main directions and more productive belt conveyors have been installed on the incline and the sloping shaft. Timely delivery of the workers to the sections has been provided. A section for assembly and disassembly of mining equipment, a shop for conveyor repair, and a laboratory for testing and checking electrical equipment and cables have been set up at the mine. About 190 innovators' suggestions were introduced in 1981-1982; their economic effect is more than 120,000 rubles. Wage distribution in the crews is carried out with the use of the coefficient of labor participation and about 30 percent of the hourly wage workers are covered by the system of payment for standardized assignments.

The measures that were implemented made it possible for the "Miuskaya" Mine's collective to increase labor productivity in 1983 by 2.8 percent in comparison with 1982. The collective fulfilled the plan for the first 3 years of the five-year plan ahead of schedule, on 17 October, and the plan for 1983 on 13 November.

At the Krasnarmeyskugol' association's "Krasnolimanskaya" Mine, the average monthly labor productivity per worker was raised to 76.6 t. High technical and economic indicators were achieved as the result of clearcut organization of the work in the crews and teams, the dissemination of progressive labor methods, the introduction of new equipment and technology, and the automation of production processes.

Particularly significant successes were achieved by V.I. Ignat'yev's crew, which produced more than 1 million t of coal in 1983. The average daily production load was 3,050 t (as against a planned figure of 2,814 t) and the monthly labor productivity per working face worker was 678.9 t (as against a planned figure of 605 t). The crew works under the slogan "To Each Coal Face--Maximum Productivity!"

At the Lisichanskugol' association's "Kremennaya" Mine, 2PNB-2 and 1PPN-5 rock-loading machines are used at the faces on the slopes and a GPK combine is used when driving field workings. The rock mass is transported away from the preparatory faces by conveyors. Special crews have been organized for the delivery of materials and equipment to the faces, as well as for assembling and disassembling mining and cutting equipment. Although the cross-sectional area of the preparatory workings has increased from 9.2 to 13.8 m<sup>2</sup>, they are being cut at an average monthly rate of more than 100 m. All the longwalls are being worked by the pillar system. Thanks to the introduction at the working faces

of the  $k^H_8$  bed of MK-75 and 1MKM complexes with 1GSh-68 combines, which made it possible to reduce the length of the upper recesses considerably, the production load is greater by a factor of 1.4 than it was in 1981. Conveyor delivery of the rock mass and storage of it in bunkers are used extensively in order to improve transportation work. Three storage bunkers with a total capacity of 520 m<sup>3</sup> have been organized in direct proximity to the active sections. From the working faces, conveyors deliver the fuel into the storage bunkers, whence it is then loaded into cars for further transport; this reduces the effect of interruptions in the transport work on extraction at the longwalls. In order to receive the coal sent up from the mine, a storage bunker has been built on the surface. It has a capacity of 700 t, and from it the coal is sent into the concentration center. In connection with this, shutdowns at the concentration center no longer mean idle time in the mine.

The mine's main and section conveyor lines have been automated. The auxiliary shaft's traffic capacity has been increased as the result of the installation of a 2Ts3 x 1.5 lifting machine. An improvement in the reliability of the operations at the longwalls, of the mine transportation service and the surface production complex was the basis for a reduction by a factor of two in losses of working time. In comparison with 1981, average daily coal extraction increased by 19 percent in 1982, and for 1983 versus 1982, the increase was 10.4 percent. In connection with the enlargement of the active line of working faces in 1983 (in comparison with 1981) by 13 percent, its output increased by 24 percent. Labor productivity increased by 17.5 percent in 1982 in comparison with 1981, and by 9.8 percent in 1983 in comparison with 1982.

At the Krasnodonugol' association's "Pobeda" Mine, measures have been implemented to improve the supplying of materials, compressed air and empty cars to the preparatory faces, as well as to improve the maintenance and preventive repair of the mining equipment. This made it possible to cut, on a timely basis, a crosscut, a ventilation shaft between the 350- and 460-m levels, a conveyor slope and a bypass around the 570-m level, as well as to concentrate the mining work on the level, insure an adequate air supply, improve the system for transporting coal by conveyors from the 570-m level to the ship-hoist loading equipment on the 350-m level, and reduce to a minimum down time at the longwalls because of shutdowns in the intramine transport system. Labor productivity increased by 6 percent in 1982 and 31.1 percent in 1983 (in comparison with the indicators for 1981 and 1982).

At the Roven'kiantratsit association's "Roven'kovskoye" sh/u, planing units are being used effectively to work the  $h_7$  bed, which is 0.80-0.83 m thick. In 1983, the crew of working face miners led by I.A. Lopatko achieved a daily production load of 601 t from a longwall 148 m long, using a complex with aa UST-2m planing unit. In order to crush the large chunks of coal that remain after the pass of the plane, a special tool that eliminates manual labor has been introduced. The use of an UGN-1M unit at the SNU-5 oil station instead of a VNR 32/200 pump made it possible to increase by a factor of 1.5 the rate of advance of the mechanized timbering sections. The bed of the planing unit's drive was strengthened, which increased its operational reliability. The length of the lower recess was reduced. Labor productivity in this mine administration increased by 14.8 percent in 1983 in comparison to the 1982 level.

On the basis of timely preparation of the line of working faces at the Pavlogradugol' association's Mine imeni Leninskiy komsomol Ukraina, labor productivity increased by 6.4 percent in 1982 and 10.7 percent in 1983 (in comparison with the 1981 and 1982 indicators). In 1983, the volume of preparatory workings that were driven increased by 18.9 percent and the length of the line of working faces by 9.6 percent. The average monthly rate of cutting of workings at the mine was 170 m.

Under undulating bed conditions, the preparation of reserves for development is done with main paneled workings with the cutting of long pillars along the rise. The basic main transport lines are equipped with KRU-350, 1L-100K and LU-120 conveyors, and the assembly ways at the longwalls have SP-63, PTK and 1LT-80 conveyors. Preparatory workings are driven with 4PP-2 and GPK entry-driving machines. In order to increase the operational reliability of the 4PP-2 machines, their frames and receiving hoppers have been strengthened, the pull-type reloader has been redesigned as the result of strengthening of its reducing gear section and the structure of the rubber-wheeled gantry, and the machines' skids have been replaced with wheels.

The coal extraction plan for the third year of the five-year plan was fulfilled by the mine's collective on 30 September 1983.

The work experience at progressive mines shows that high rates of increase in labor productivity are achieved by mining collectives as the result of the introduction of new mining technology, the extensive use of progressive working methods, a constant and creative search for reserves, and a strengthening of socialist labor discipline and the degree of organization at each working position.

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## COAL

### 1983 ACHIEVEMENTS, 1984 OBLIGATIONS DISCUSSED

Kiev UGOL' UKRAINY in Russian No 2 (326), Feb 84 pp 1-2

[Editorial: "Shock Labor--1984!"]

[Text] Inspired by the decisions of the December (1983) Plenum of the CPSU Central Committee and the 9th session of the 10th convocation of the USSR Supreme Soviet, from the first days of 1984 the progressive mining collectives in this republic developed a socialist competition for the fulfillment of the assignments for the 4th year of the 11th Five-Year Plan ahead of schedule, for an increase in labor productivity, and for a reduction in the production cost of coal. Many crews of working face workers have shouldered heavy socialist obligations for 1984.

USSR State Prize laureate V.I. Ignat'yev's crew, from the Krasnolimanskaya Mine imeni 50-letiya Velikoy Oktyabr'skoy sotsialisticheskoy revolyutsii of the Krasnoarmeyskugol' Association, fulfilled last year's obligations ahead of schedule by digging 1.071 million t of coal from a single longwall by 7 December 1983. In all during the 3 years of the 11th Five-Year Plan, this crew has sent 2.705 million t of fuel up the shaft, including 320,900 t above the planned figure.

Striving to make a noteworthy contribution to supporting the national economy with fuel and mark 1984 with highly productive shock labor, the crew led by V.I. Ignat'yev has pledged to complete its annual assignment for coal mining by 7 November and to take 1 million t of coal from a single longwall, including 140,000 t of above-plan coal. Because of more efficient use of mining technology and an improvement in the professional skills of each member of the crew; loading at the face will be increased to 3,020 t per day and the labor productivity plan will be overfulfilled by 2 percent. By careful use of materials, spare parts and electricity and an improvement in the preservation of mining equipment, the production cost of extracted coal will be reduced by 0.5 percent and 12,000 rubles will be saved. By introducing innovative suggestions into the production process, an economic effect of at least 5,000 rubles will be achieved.

V.I. Ignat'yev's crew also pledged to take under its patronage G.F. Tsaruk's extraction crew and help it increase its loading at the face and to continue its already traditional competition with Hero of Socialist Labor A.D. Polishchuk's crew from the Trudovskaya Mine of the Donetskugol' Association.

Having fulfilled its assignments for coal extraction for the first 3 years of the five-year plan ahead of schedule, Polishchuk's crew took on heavy socialist obligations for 1984: to produce 500,400 t of coal, including 7,400 t above the planned figure; to increase the labor productivity of its working face miners by 1.5 percent; to reduce the ash content of the coal it extracts by 0.1 percent; to reduce the production cost per ton of coal by 5 kopecks (under the planned figure); to save 10,000 rubles by introducing suggestions of innovators and inventors.

Hero of Socialist Labor A.Ya. Kolesnikov's crew, from the Molodogvardeyskaya Mine of the Krasnodonugol' Association, fulfilled its plan for the first 3 years of the 11th Five-Year Plan ahead of schedule, on 4 August 1983. The collective vowed to fulfill its 1984 plan for the mining of coal by 10 December and to produce 700,000 t of fuel, including 50,000 t more than was planned. As the result of an improvement in the organization of labor and the more efficient use of coal-mining technology, the crew has resolved to increase its daily loading at the face to 2,100 t and overfulfill the labor productivity plan for each member of the crew by 5 percent. Because of the careful use of materials and electricity, an increase in the service life of mining equipment between repairs, and a reduction in the production cost of extracted coal, 20,000 rubles will be saved. Ten innovative suggestions will be introduced and an annual economic effect of at least 20,000 rubles will be achieved.

A.Ya. Kolesnikov's crew resolved to help the crew of working face miners led by V.P. Dement'yev, from the Mine imeni XXV s"yezd CPSU of the Krasnodonugol' Association, to fulfill its plan and its adopted socialist obligations for an increase in coal extraction and to improve the efficiency of the production process.

The collective headed by A.Ya. Kolesnikov challenged V.G. Tadyko's crew of working face miners, from the Mine imeni 50-letiyе USSR of the Krasnodonugol' Association, to a socialist competition.

Hero of Socialist Labor G.M. Sirota's crew, from Velikomostovskaya Mine No 3 of the Ukrzapadugol' Association, also fulfilled its plan for the first 3 years of the 11th Five-Year Plan ahead of schedule, on 25 July 1983. In those 3 years it produced about 1.446 million t of coal, including 118,000 t above its planned figure. The average daily loading at the working face was 1,225 t in 1983.

In order to celebrate 1984 with highly productive shock labor, the crew pledged to fulfill its annual coal extraction plan by 1 December and to dig 500,000 t of coal from a single longwall, including 45,000 t above the established plan.

Because of more efficient utilization of mining technology and an improvement in the technology and organization of production processes, the crew has vowed increase loading at the face to 1,510 t per day and labor productivity by 4 percent above the figure in the plan. Through the rational and careful use of materials and electricity and an improvement in the quality of mining equipment repairs, the production cost of coal extraction will be reduced by 1 percent and 15,000 rubles will be saved.



From the introduction of innovators' suggestions into the production process, an annual economic effect of at least 15,000 rubles will be achieved.

This crew also plans to help the Ya.A. Mikhaylishin' crew of working face miners, from the Mine imeni 60-letiyе USSR of the Ukrzapadugol' Association, and continue its socialist competition with the crew led by USSR State Prize laureate V.I. Rybinskiy.

Socialist obligations have been discussed and assumed at the general meetings of collectives of crews.

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## TRANSPORTING COAL BY PIPE THROUGH AIRWAYS

Kiev UGOL' UKRAINY in Russian No 2 (326), Feb 84 pp 22-23

[Article by S.A. Ostapenko and G.Ya. Palant, candidates of technical sciences, and S.A. Mel'nikov and Ye.P. Chernyavskiy, engineers, Donets Scientific Research Institute of Coal]

[Text] A promising direction in the further improvement of transport inside a mining walkway or level is a change to pipeline-type pneumatic transport systems (TPTS). These systems make it possible to move bulk materials in all possible directions under the most crowded conditions, and can be of almost unlimited length insides fields of active mines.

The basic advantages of TPTS's, which are the reason for their extensive use in various branches of the national economy, are: a powerful freight flow concentration in pipes with a small cross-sectional area, no need to transfer the material to another carrier, the carrier is sealed, the freight is protected against losses, the operation can be fully mechanized and automated, there is no need for maintenance personnel on the pipeline routes. The system's flaws when the solid phase mass is related to the energy medium within limits of 0-15 [sic] are increased consumption of electricity for the movement of significant volumes of air and intensive abrasive wear of the pipeline.

Having selected a rational transportation method and a location for a TPTS, by combining different functional characteristics into a single installation it is possible to reduce the operating costs. One of the solutions is the installation of a vacuum TPTS in workings with an outgoing ventilation stream, where it is possible to increase the actual working time of the purification complex by eliminating technological down time at the longwall and improve the ventilation of the face and adjacent workings considerably by efficient removal of dust and methane. When this method is realized (Figure 1), coal from mining unit 1 is transported along the wall by scraper conveyor 2 until it reaches the airway and enters the intake hopper 3 of a crusher, where it is pulverized into pieces no larger than 100 mm. The goal is then sucked through vacuum nozzle 4, along with air that comes through a hose from tap 5 (located near the face), into transport pipeline 6, along which the flow is fed into separator 8, where the particles drop out of the energy carrier, which is losing speed, and pass through a sluice valve into reception point 9. The air, which is saturated with dust, goes from separator 8 through pipeline 13 into filter 12, where it is cleaned and evacuated by exhaust fan 10. The mineral can be transported

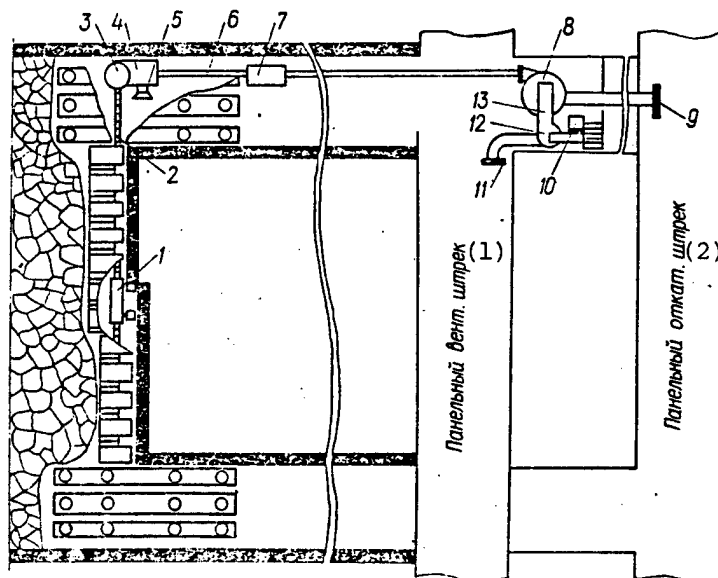


Figure 1. Process flow diagram of operation of vacuum TPTS.

Key:

1. Paneled airway

2. Paneled haulage drift.

away from the reception point to the surface by the existing facilities in the paneled haulage drift or by a pressure-type TPTS that is operated from a separate power station. The used air, which contains up to 2 percent methane and coal dust and fines (up to 3 mm in size) is sent through pipeline 11 into the paneled airway or into a degasification system, where the mixture is enriched with methane and transported to the surface for utilization (burning) in the mine's boiler works or the furnaces of a TETS. The passage of the coal fines and dust through the dust-exhaust systems has practically no effect on their functioning.

In order to increase the efficiency of the transportation process and reduce the speed of the solid fragments, which makes it possible to reduce the intensity of abrasive wear of the transportation pipeline, a special device 7 is built into the vacuum TPTS. This device divides the continuously moving mass of free-flowing product into separate batches, using buffer air cushions. Low-frequency vibrations are created in pipeline 6 by a pressure pulsation component. The advantages of such a mode in comparison with transportation in a suspended state are a lower flow rate, as a result of which less power is required, less intensive disintegration of the mineral and less wear on the pipeline.

In a TPTS it is possible to distinguish three zones, each of which requires special equipment. In the mixing zone, all the particles being transported are accelerated to the required velocity, it being the case that the velocity needed to move the heaviest particles is considered to be the minimally allowable one for the energy carrier. The operating conditions in the transportation zone depend on the homogeneity of the mixed flow, the minimally allowable velocity and pressure losses due to friction. The solid particles are separated from the energy carrier in the separation zone.

Let us discuss the equipment of the transportation zone, where the most intensive pipeline wear occurs. Both research and operating experience show that the nature of the wear along the perimeter of the cross-section of a horizontally placed TPTS varies because of the effect of gravitational forces on the wearing process. The bottom of the pipe is subjected primarily to impact loads, whereas the walls suffer from the abrasive action of the particles being transported. The angle at which the material being transported and the surface being worn down meet has a substantial effect on the intensity of the wearing process. When particles coming into contact with the pipe above its lowest point are in motion, they are subjected to centrifugal forces that are directed along the normal to the tangent at the point of contact and press the particles into the pipe's walls. This causes an increase in the intensity of the wearing process and energy losses during transportation.

In order to avoid the effect of the centrifugal forces it is possible to enlarge the pipeline's diameter, which fact has been confirmed practically. However, this leads to an increase in the mass of the pipeline and consumption of the energy medium (by an amount that is approximately proportional to the increase in the cross-sectional area) and, in the final account, to an increase in capital and operating expenses.

Most promising from the viewpoint of wear resistance and transporting capacity is a nonround horizontal pipeline fitted with flat inserts in the form of a component chute. The insert's bottom is placed on an elastic base and it is made of a material that is wear resistant to impact effects, whereas the bottom of the side wall is made of a material that can withstand the abrasive effect of the particles being transported. The inserts give the pipeline a more rational shape and insure equalization of the rates of motion of the material being transported in different cross-sections (that is, the moving flow takes on homogeneous properties). As a result, the intensity of the wearing process decreases and the energy carrier's transporting capacity increases.

At the Artemugol' association's Mine imeni Kalinin, tests were conducted with composite transportation pipelines 200 and 225 mm in diameter that had chute-shaped inserts. The results showed that pressure losses were reduced by 30 percent and wear by a factor of 5-7 in comparison with round pipes.

In principle, the possibility of creating a vacuum TPTS with a productivity indicator of 360 t/h for coal particles up to 100 mm in size presents no technical difficulties for the present level of technology, as is the case with the joint transportation of coal and methane by a single system. When the TPTS is in operation, the probability of an explosion in the pipeline is practically eliminated, since the energy carrier's high speed makes ignition and propagation of a flame impossible. When the system is turned on or off and the speed of the air decreases, the prerequisites for an explosion appear in the storage areas and the separator. For safety's sake, it is possible to introduce an inert medium (nitrogen, compressed carbon dioxide) into the different parts of the system in order to reduce the oxygen concentration below 15 percent by volume or to increase the methane content above 20 percent. For this purpose, in a TPTS plan it is sufficient to specify that the distribution equipment be able to withstand an excess pressure during an explosion of up to 350 kPa, whereas

the separation zone equipment must be able to withstand up to 420 kPa. There are also no technical complications involved in eliminating the static electricity that is caused by the friction of the material being transported rubbing against the pipeline's walls.

The realization of the method of transporting a mineral along an airway with the help of a vacuum TPTS when flat and sloping beds are being worked with the traditional working face ventilation method makes it possible to obtain the following advantages:

- relieve the haulage drift of the basic freight flow, which creates the prerequisites for organizing the more efficient delivery of people, equipment and materials to the longwall;

- increase the productivity of face complexes by reducing the idle time that is unavoidable for the present methods used to transport the basic freight flow;

- avoid having to drive side workings;

- improve ventilation at longwalls and create a safer atmosphere in underground workings as the result of effective evacuation of dust and methane;

- eliminate the probability of traumatism in the section transport system.

The proposed vacuum TPTS plan is easy to write into modern process flow diagrams for the development of coal beds and to be combined with existing forms of underground transport. Besides this, such a system is sufficiently mobile for rapid realization. Its economic effectiveness depends basically on the capital and production expenses for the power equipment, which--according to preliminary data--will not exceed the expenditures for existing forms of transportation.

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DRYING COAL IN A FLUIDIZED BED

Kiev UGOL' UKRAINY in Russian No 2 (326), Feb 84 pp 38-39

[Article by A.M. Kotkin and Yu.M. Rubin, candidates of technical sciences, and G.V. Alekseyev, engineer, Ukrniiugleobogashcheniye]

[Text] On the basis of investigations of the process of drying coal in a fluidized bed that were conducted by Ukrniiugleobogashcheniye [Ukrainian SSR State Planning, Design and Scientific Research Institute of Coal Enrichment and Briquetting], Yuzhgiproshakhtprom [probably Southern State Institute for the Design and Planning of the Mining Industry] has completed a plan for a drying house consisting of four units (three working and one reserve) for the Antratsitugleobogashcheniye [probably Anthracite Enrichment] Association's "Sverdlovskaya" TsOF [Central Concentration Plant]. The drying house's planned productivity for evaporated moisture is 56 t/h, and that of a single unit is 18.6 t/h. The dryer's feed coal productivity is 300-330 t/h.

The unit with the fluidized bed (Figure 1) consists of a heat generator for which natural gas with heating power  $Q_H^p = 35,000 \text{ kJ/m}^3$  is burned, drying equipment with a gas distribution grid having an area  $F_p = 12 \text{ m}^2$ , and two parallel dust collection lines. Each line consists of a dust extractor that is 3 m in diameter and was designed by NII Ogaz [State Scientific Research Institute for Industrial and Sanitary Purification of Gasses], a BPR-100 battery-powered dust catcher, an MRP-100 wet dust catcher and suction-blasting equipment: two VM-18 milling fans with productivity  $V = 10^5 \text{ m}^3/\text{h}$  and pressure  $H = 10,200 \text{ N/m}^2$  and two DN-21 exhaust fans, each with productivity  $V = 10^5 \text{ m}^3/\text{h}$  and pressure  $H = 4,000 \text{ N/m}^2$ . The dryer is equipped with a feed coal bunker with a capacity of 330 t, monitoring and measuring instruments, and a process automation system.

Natural gas is fed into a gas and fuel oil burner, into which air is forced by the primary blasting fan. The heat carrier formed in the heat generator by the combustion of the gas is diluted to a temperature of 350-450°C with air supplied by the secondary blasting fan and directed under the gas distribution grid, which has a clear opening of 10 percent.

A PSB-35 feeding device is used to move the moist coal into a conical dispersing device, which distributes the coal uniformly on the grid; as a result of interaction with the heat carrier, the coal is transformed into a pseudoliquid state. Since the pseudoliquefaction causes intensive agitation of the coal and the drying equipment to operate in the ideal displacement mode, in the

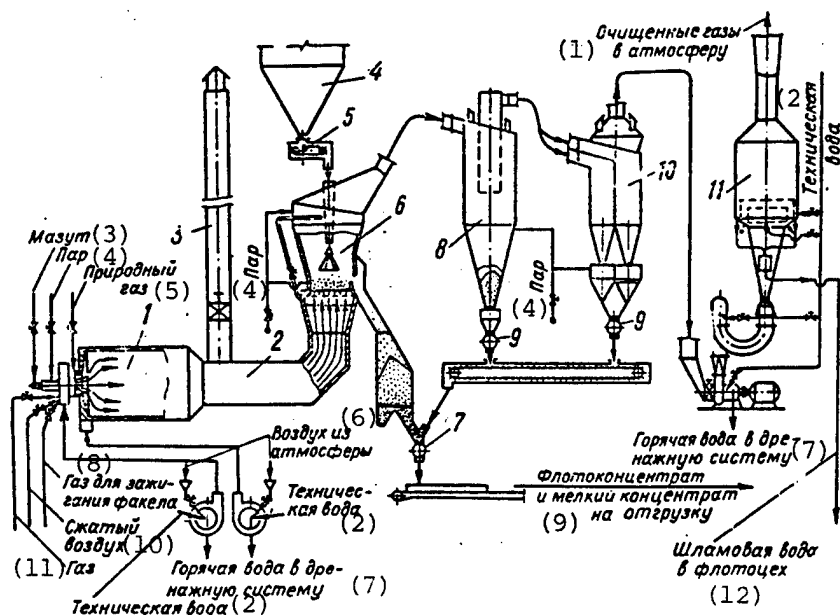


Figure 1. Diagram of drying unit with fluidized bed: 1. heat generator; 2. horizontal flue; 3. rastopchnaya [possibly exhaust] pipe; 4. bunker for moist concentrate; 5, 7. PSB-35 and SBP-300 feeding devices; 6. drying equipment; 8. dust extractor designed by NII Ogaz; 9. blade-type gates; 10. BPR-100 battery-powered dust catcher; 11. MPR-100 wet dust catcher.

Key:

- |                                       |   |
|---------------------------------------|---|
| 1. Purified gases into the atmosphere | 7. Hot water into drainage system                         |
| 2. Industrial water                   | 8. Gas for ignition of flame                              |
| 3. Fuel oil                           | 9. Flotation concentrate and fine concentrate to shipping |
| 4. Steam                              | 10. Compressed air  |
| 5. Natural gas                        | 11. Gas   |
| 6. Air from atmosphere                | 12. Polluted water to flotation shop                      |

fluidized layer there is efficient heat exchange between the moist coal and the heat-carrying agent, so at a height of 200 mm above the grid, the heat carrier's temperature reaches 60°C. In order to maintain the fluidized bed at a certain level, a regulatable threshold at a height of 400-600 mm is provided. The dried coal is poured through the threshold and dropped onto a conveyor belt by SBP-300 feeding devices.

The heat generator and the lower part of the drying apparatus operate at a pressure  $p_T = 5,000-6,000 \text{ N/m}^2$ , whereas at the dryer's output the pressure is  $p_0 = 20-60 \text{ N/m}^2$ . The resistance of the fluidized bed and grid is  $5,000-5,500 \text{ N/m}^2$ .

When bulk materials undergo pseudoliquefaction, a large part of the heat carrier passes through the layer in the form of gaseous bubbles that carry coal particles of various sizes to the surface of the layer. As they burst on the surface, the bubbles form channels through which the gas jets throw out coal particles of all sizes into the space above the layer. Particles for which the ejection speed  $w_e$  is greater than the velocity  $w_g$  of the gas flow above the

layer rise to some height and then return to the layer, whereas particles for which  $w_e < w_g$  are carried out of the apparatus and enter the dust-catching system.

The drying process's technological parameters were first worked out with a single unit, with the temperature of the heat carrier under the grid being 250-300°C. The material used was anthracite 0-6 mm in size. During the start-up period, the small (5-10 percent) content of coal less than 0.5 mm in size and the presence in it of a significant amount of free moisture had a favorable effect on the exposure of the interphase surface and the heat exchange between the heat carrier and the moist material, as a result of which the temperature of the gasses at the outlet from the layer was 38-42°C for a dryer cake moisture level of 6-8 percent.

It has been established that the higher density of the anthracite also caused increased layer resistance. The total resistance of the layer and the grid was 5,000-5,500 N/m<sup>2</sup>, or 1,000-1,500 N/m<sup>2</sup> higher. The drying of coal with a small amount of moisture made it possible to check the unit's operation with a maximum load (300-330 t/h, or 25 t/m<sup>2</sup>) of feed coal. At the 330 t/h productivity level, the coal was distributed uniformly over the grid by the conical dispersing device, and at a pseudoliquefaction rate of 3-4 m/s, the material was agitated intensively on the grid without any dead zones, so the drying process proceeded stably and efficiently. All of the discharging mechanisms, which provided unchecked transportation of the material through the unit, also performed satisfactorily.

No particular difficulties were encountered when the functioning of the drying units' separate assemblies was adjusted or when the units were put into operation. However, the high efficiency of the heat-exchange process resulted in a low gas temperature at the outlet from the layer, which led to the condensation of water vapor in the dust-catching system. The transfer of gas at a temperature of 250-280°C from underneath the grid through a by-pass heat conduit into the dust-catching system did not yield a positive result.

The temperature of the exhaust gasses at the outlet from the drying equipment can be raised by increasing the temperature of the heat carrier under the grid, but this reduces the moisture in the dryer cake to 4-5 percent and intensive dust formation takes place in the transportation line. Calculations of the gasses' moisture content at the outlet from the dryer for different evaporated moisture productivity rates and plotting of the drying process in the coordinates of an I-d diagram made it possible to determine the water vapor condensation temperature for different degrees of saturation of the exhaust gasses. A comparison of the practical and calculated temperature values for these gasses showed that it is 8-10°C below the dew point. Measurements were used to establish the following: for a gas pressure under the grid of 5,500 N/m<sup>2</sup>, rarefaction  $h = 80-120$  N/m<sup>2</sup> at the outlet from the drying equipment, and temperature  $t_1 = 270^\circ\text{C}$ , a heat conduit with a total cross-sectional area  $F_T = 0.074$  m<sup>2</sup> can transfer 3,975 m<sup>3</sup> of hot gasses per hour and raise the temperature of the exhaust gasses from 42 to 46°C, which does not make it possible to eliminate the condensation of water vapor in the heating line. In connection with this, the cross-sectional area of the equipment's heat conduit was increased by a factor



Влажность угля, % (1)		Производи- тельность, т/ч (4)		Темпера- тура, °C (7)		Сопротив- ление слоя и решет- ки, Н/м <sup>2</sup> (10)	Расход природ- ного газа, м <sup>3</sup> /ч (11)
исход- ного (2)	про- сушен- ного (3)	по ис- ход- ному углю (5)	по испа- рен- ной влаге (6)	под ре- шет- кой (8)	на вы- ходе из (9) су- шилки		
13,3	7,0	300	20,3	400	60	5500	2100
13,1	6,8	300	20,3	370	56	5400	2100
11,6	6,3	330	18,7	360	56	5300	2200
11,7	6,4	330	18,5	350	54	5400	2200
12,0	7,0	300	16,0	350	54	5100	1900
12,6	7,0	320	19,3	390	60	5500	2300
12,7	6,9	320	19,3	380	59	5500	2300
12,7	6,7	310	19,7	380	58	5600	2350
12,9	7,1	330	20,2	390	58	5500	2400
13,0	8,0	330	17,8	330	60	5200	2123

Key:

- |                            |  |
|----------------------------|--|
| 1. Moisture in coal, %     | 7. Temperature, °C                                 |
| 2. Feed coal               | 8. Under grid                                      |
| 3. Dried coal              | 9. At outlet from dryer                            |
| 4. Productivity, t/h       | 10. Resistance of layer and grid, N/m <sup>2</sup> |
| 5. For feed coal           | 11. Natural gas consumption, m <sup>3</sup> /h     |
| 6. For evaporated moisture |  |

of two, the exhaust gasses' temperature was raised to 55-60°C and the unit operated at the condensation temperature limit.

In the second half of 1982, the content of coal pieces smaller than 0.5 mm in the incoming coal rose to 20-30 percent and the moisture increased to 13-14 percent, which made it possible to increase the temperature of the heat carrier under the grid to 350-400°C. Because of a slight deterioration in the heat exchange process, the temperature at the outlet from the layer was 55-60°C. In this case the increase in the temperature in the layer was not accompanied by a lowering of the dried coal's moisture content below 6 percent, and dust formation in the line was not seen. In connection with the indicated temperature beneath the grid, the amount of heat sent through the heat conduit into the dust-catching system increased, as a result of which the temperature in front of the exhaust fan increased to 65-70°C and water vapor condensation ceased. The complex of work that was done in connection with introducing the drying installations made it possible to increase their productivity to 17-20 t/h of evaporated moisture, which corresponded to their planned indicators, and to plan measures for the intensification of the process that will increase their productivity to 25 t/h. The average indicators of the operation of the dryers with the fluidized beds at the "Sverdlovskaya" TsOF are presented in the table. Planned dryer productivity has been achieved with a gas temperature beneath the grid of 350-400°C, but raising the temperature to 500-600°C will make it possible to raise the productivity level to 25 t/h.

The distinctive features of the process of drying coal in a fluidized bed are intensive heat exchange and stability of the process's basic parameters: resistance of the fluidized bed, the gasses' temperature at the outlet from the bed, the specific heat consumption rate per kilogram of moisture (3,560-3,760 kJ/kg). In connection with this, the specific productivity for evaporated

moisture is  $W_y = 1.5-2 \text{ t/m}^2$ , the moisture pressure is  $A = 205 \text{ kg/m}^3$ , and the coefficient of heat exchange between the heat carrier and the coal is  $\alpha = 2,680 \text{ W/(m}^2 \cdot ^\circ\text{C)}$  for a pseudoliquefaction rate of  $w_\pi = 3-4 \text{ m/s}$ . The coefficient of heat exchange during the drying of anthracite can be determined with the formula

$$\alpha = 37.3(w_\pi d)^{0.017} \lambda / (\nu^{0.017} d),$$

where  $d$  = determining diameter of the particles in the polydispersed layer,  $m$ ;  
 $\lambda$  = coefficient of thermal conductivity of the heat carrier,  $\text{W/(m} \cdot ^\circ\text{C)}$ ;  $\nu$  = kinematic coefficient of viscosity.

Let us mention here that when the configuration of the moist coal bunker, the feeding device and the drying equipment was being figured out, the physical properties of anthracite, which has a low moisture-retention capacity, were not taken into consideration. When coal with a moisture content of 12-15 percent is accumulated in the bunker, a large amount of drains onto the refractory masonry of the drying equipment and the heat generator, which results in its destruction (when the unit is not in operation). Therefore, when planning installations for drying anthracite, it is necessary to provide for water drainage from the lower part of the bunker or from the feed device transporting the coal into the drying equipment.

The productivity of dryers with a fluidized bed and a grid area of  $12 \text{ m}^2$  corresponds to that of the drying drums that are 3.5 m in diameter and are now being used in coal concentration plants. The specific capital expenditures per ton of evaporated moistures are 15.1 and 17.8 rubles.

The absence in the equipment with the fluidized bed of revolving assemblies and mechanisms that are subject to abrasive wear, which is particularly important when drying anthracite, makes it possible to reduce metal consumption by 150-170 t during the production of each unit and by 60-80 t when it is repaired in the case of its being used instead of a drying drum. Thanks to the low labor- and material-intensiveness of the repair work, the simplicity of maintenance and the highly efficient heat exchange, it is feasible to use such units in anthracite concentration plants.

The annual economic effect from the use of installations for drying coal in a fluidized bed instead of drum drums is 700,000 rubles at the "Sverdlovskaya" TsOF (as determined by comparing the capital and operating expenses for drying in drums at the "Komendatskaya" TsOF).

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COAL

UDC 622.002.5.004.67:658.012.2(047)

#### IMPROVED REPAIR WORK ACCOUNTING METHOD DESCRIBED

Kiev UGOL' UKRAINY in Russian No 2 (326), Feb 84 p 9

[Article by V.I. Moroz and V.A. Neyezhmakov, engineers, Donets Scientific Research Institute of Coal, and M.I. Tikhonov, engineer, Dobropol'yeugol' [expansion unknown]: "Improving the Planning of Routine Repair Work and Accounting for Completed Repair Work"]

[Text] The level of the organization and effectiveness of preventive maintenance (PPR) of equipment used at the face is determined to a significant degree by the quality of the planning of routine repair work. In order to improve the planning of repair work, it is necessary to start with the following basic assumptions. The service life of parts, assembled units and complete equipment units as a whole depends on many factors (quality of production or capital repair, operating conditions, equipment load, the way it is used, quality of maintenance and routine repair and others) that are impossible to allow for with a sufficiently high degree of accuracy. Service life is affected by both objective factors that can be allowed for when planning repair work and subjective factors that are impossible to take into consideration in the planning order. The widely used regulatory methods of repair are economically ineffective and technically inadvisable, since they provide for the performance of routine repair work in a strictly defined average operating time, without allowing for the actual technical status of the equipment.

Practice has shown that the existing PPR schedules do not meet the requirements placed on them and on the planning of repair work. It is necessary to attempt to reach a situation where PPR schedules are not only working documents, but also documents that account for the performance of repair operations and the consumption of spare parts. The use of computers for compiling schedules is still ineffective; actually, they are used as mechanical printers for the planning of average branch repair periods, without allowing for specific operating conditions, their diversity and the equipment's technical status; that is, the basic factors that exert the decisive effect on the service life of equipment and its elements.

PPR schedules developed by Donugi [Donets Scientific Research Institute of Coal] have now been introduced for all complexly mechanized longwalls being worked by the Dobropol'yeugol' association. For example, the PPR schedule for the 1GSh-68 narrow-wedge combine at the Mine imeni RKKA [Workers' and Peasants'

Red Army] consists of two sections: planning the amount of repair work, the calendar time for the work and accounting for completed operations. The planning section contains: project number according to the operations chart, names of the operations, service life (in thousands of tons). The calendar time for the work and the completed repair operations are accounted for by weeks of combine operation, beginning with the time it was put into operation. Planned and actual coal extraction are accounted for by a weekly cumulative total.

The "Name of Operations" column contains entries about combine maintenance work: weekly (numbers 29-36 on the operations chart), monthly (39-42) and work done for first (46-51) and second (52-59) current repairs. Unplanned work (61-66), which can be done periodically by the repair personnel of a section or mine with large labor costs, is also included. Operations for weekly maintenance of the combine are not planned, and only their performance is accounted for. Operations for monthly maintenance and first and second current repairs are planned on the basis of operating time; that is, on the basis of a certain achieved load on the combine.

Using the repair enterprises' data on 1GSh-68 combines operating in mines belonging to the Dobropol'yeugol' association, an analysis of the combine's service life until capital repair was made. In the case under discussion, the service life was 222,000 t, and the calendar period of service was 12 months. Considering these characteristics of the combine, the repair work has been distributed into groups: first (monthly work)--18,500 t; second (first current repair)--55,500 t; third (second current repair)--111,000 t. The calculated operating time for each group is indicated in the "Standard Service Life" column. Unplanned work (61-66) is carried out depending on the actual status of the assembled units, including the achieved service life until capital repair.

The section's planned extraction level is listed in the second section of the PPR schedule. On the basis of this information, the section's mechanic plans the performance of the repair work in each group. When the appropriate service life (by actual coal extraction) for one of the groups is achieved, the mechanic plans the operations for the specific working week.

The schedule provides for correction of the repair performance dates with the help of the first replacement's service life (actual). On the basis of an analysis of the standard and indicated service lives, the section mechanic transfers the work performance data to the appropriate week according to the corrected service life that has been achieved. In the case of replacement of several assembled units during the course of a week, the quantity replaced is indicated by a number.

From an analysis of the PPR schedule for the 1GSh-68 combine it is obvious that the standard service life suggested by the producer plant does not correspond to the actual one for all assembled units and that the discrepancies are significant. For instance, the standard service life for an NP-10 single-plunger pump is 111,000 t, whereas the actual one (the first-replacement standard) is 22,200 t, which indicates the low reliability of this assembled unit. A corresponding analysis of PPR schedules for the performance of the minimum

obligatory daily work on repair shifts makes it possible for the operators to plan repair operations more concisely, thereby reducing the number of failures during working shifts.

As a result of the introduction of these PPR schedules at the Mine imeni RKKA, the number of equipment breakdowns for complexly mechanized longwalls was reduced by 52.5 percent and an economic effect of 1,200 rubles per longwall was gained. Practice shows that working with the PPR schedules does not require great expenditures of time and that they reflect the actual status of the maintenance and current repair of equipment under specific conditions both objectively and visually.

An analysis of PPR schedules for each type of equipment makes it possible to: define more precisely the amount of planned and unplanned replacement of parts and assembled units that is being done, the make-up of maintenance work, the list of parts and assembled units that are subject to replacement, examination and adjustment, the amount of planned repair work in each group; establish repair work volumes for different geological mining conditions; calculate more reliably the need for basic parts and assembled units, by item, for a known equipment load.

Consequently, a PPR schedule makes it possible to accumulate information that can be used when planning repair work, when determining the need for spare parts, and for substantiating the number of personnel in a repair unit and the labor-intensiveness of operations. Besides this, thanks to the visual nature of the schedule, it is possible to evaluate quickly and reliably the technical status of equipment and elements of equipment, the organization of the PPR into sections, and the quality of repair work that has been done.

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COAL

SYNOPSIS OF ARTICLES IN UGOL' UKRAINY, FEBRUARY 1984

Kiev UGOL' UKRAINY in Russian No 2, Feb 84 p 48

UDC 622.002.5.004.67:658.012.2(047)

IMPROVING THE PLANNING OF ROUTINE REPAIR WORK AND ACCOUNTING FOR COMPLETED REPAIR WORK

[Synopsis of article by V.I. Moroz, V.A. Neyezhnikov and M.A. Tikhonov, p 9]

[Text] A preventive maintenance schedule for the repair of mining equipment used at the face that makes it possible to improve the planning of routine repair work and keep track of repair operations that have been completed.

UDC 622.235:662.004.18

REWARDING MASTER BLASTERS AND IMPROVING THE EFFECTIVENESS OF BLASTING WORK

[Synopsis of article by G.K. Shtereverya, p 10]

[Text] The system for rewarding master blasters at the Pavlogradugol' association's mines and the experience in and results of its use.

UDC 622.268.13

WORK EXPERIENCE OF CUTTING CREWS AT THE 'TORETSKAYA' MINE

[Synopsis of article by V.N. Zhmykhov, pp 11-13]

[Text] On the work of the cutting crews at the Dzerzhinskugol' association's "Toretskaya" mine. Technical and economic indicators. 1 table; 3 illustrations.

UDC 622.26.8.13:658.387.4.001.86

HIGH-SPEED CUTTING OF WORKINGS AT THE 'ZHITOMIRSKAYA' MINE

[Synopsis of article by M.I. Klimashevskiy, pp 13-14]

[Text] Working principle and successes achieved by V.L. Shipnevskiy's crew at the Oktyabr'ugol' association's "Zhitomirskaya" mine. 2 illustrations.

UDC 622.232:658.387.4

#### A CREW WORKS WITH HIGH PRODUCTIVITY

[Synopsis of article by V.A. Dudko, pp 15-16]

[Text] The organization of labor in M.I. Bocharov's crew at the Voroshilovgradugol' association's "Leninka" mine. Technical and economic indicators of the work on the longwall, using a "Donbass" [Donets Coal Basin] complex. 1 illustration.

UDC 622.268.001.671.477

#### ON PILLARLESS PROTECTION OF MINE WORKINGS

[Synopsis of article by I.Yu. Zaslavskiy, pp 17-18]

[Text] Designs of effective means for protecting mine workings when dealing with ceilings that are likely to collapse and soils that have little strength. Mechanism of designs' interaction with the mountain mass. Parameters and area of wedge-type means for protecting workings. 2 illustrations.

UDC 622.023.65:539.37

#### DETERMINING THE MODULUS OF DEFORMATION OF BROKEN GROUND

[Synopsis of article by V.A. Andranovich, Yu.V. Gromov and G.A. Ivanov, pp 18-19]

[Text] Laboratory investigations of the deformation of collapsed rock in a limited quantity; a technique for determining the modulus that consists of replacing the curvilinear relationship between the load and deformations with a piecewise-linear one. 1 table; 1 illustration; 1 reference.

UDC 622.7.002.5:62-192

#### DEVELOPMENT OF TECHNOLOGICAL MODES FOR THE ELECTROFERROMAGNETIC HARDENING PROCESS

[Synopsis of article by A.P. Banatov and S.A. Yuditskiy, p 20]

[Text] The results of investigations conducted to determine the optimum technological parameters of the electroferromagnetic hardening process and their effect on the wear resistance, thickness and solidity of a coating. 1 illustration.

UDC 622.01:658.284.253.1

#### STAND FOR TESTING THE AUK-10TM--68 EQUIPMENT

[Synopsis of article by Yu.V. Larin and Yu.G. Sokolov, pp 20-21]

[Text] Layout of a stand for texting and adjusting the AUK-10TM--68 and AUK-1MUKhL-5 equipment for automating conveyor lines. 1 illustration.

UDC 622.678.62-53

#### DESIGNING PROGRAMMED VELOCITY-REGULATING CAMS

[Synopsis of article by Ya.K. Lutsishin, p 22]

[Text] Calculating the path of a programmed velocity-regulating cam, and the error in the automatic regulation system. Reducing the distortion of the actual deceleration tachogram.

UDC 622.648.6

#### TRANSPORTING COAL BY PIPE THROUGH AIRWAYS

[Synopsis of article by S.A. Ostapenko, G.Ya. Palant, S.A. Mel'nikov and Ye.P. Chernyavskiy, pp 22-23]

[Text] Process flow diagram of a transportation system that makes it possible to realize the utilization of methane and coal dust in the process of moving the mineral along an airway with a vacuum, pipeline-type pneumatic system. 1 illustration.

UDC 622.673.14-592

#### REGULATABLE PREVENTIVE BRAKING OF SINGLE-ENDED LIFTING UNITS

[Synopsis of article by A.N. Shatilo, pp 24-25]

[Text] Results of investigations of modes for preventive braking of single-ended lifting units. Area of application of regulatable and nonregulatable preventive braking systems. Functional requirements and technical solutions for a regulatable system. 2 illustrations.

UDC 622.647.2

#### X-RAY SURVEYING OF CONVEYOR BELT SEAMS

[Synopsis of article by N.T. Demchenko, V.A. Zadorozhnyy and A.M. Yesionov, p 26]

[Text] Experience in using X-ray surveying of rubber-cable belts under underground conditions in the Torezantratsit association's mines, and monitoring of the quality of seams. 2 illustrations.

UDC 621.316.3:622.213.34:622.861

#### SELECTING RATIONAL TESTING MODES WHEN EVALUATING THE SPARK SAFETY OF ELECTRICAL CIRCUITS



[Synopsis of article by E.G. Kogan, V.F. Lakhmanov and S.V. Mamchenko, p 27]

[Text] Analysis of the energy generated in an electrical discharge, allowing for the parameters of the power source, the inductive load and the configuration of the circuit. Recommendations on the selection of the safest testing modes.

UDC 622.831.322

#### OUTBREAK DANGER OF MINE BEDS IN UPPER PART OF LEVELS AT DIFFERENT DEPTHS

[Synopsis of article by S.N. Aleksandrov, V.I. Bozhenko and V.V. Nikolin, pp 28-29]

[Text] Characteristics of the formation of relieved zones in an area of coal beds adjacent to the worked-out space of the preceding level(s). Sizes by pitch of the sections of a mine bed in this area that might be worked without danger of an outbreak. 2 references.

UDC 622.817.47

#### EXPERIENCE IN DEGASIFYING A WORKED-OUT MINE SECTION

[Synopsis of article by A.S. Drabik, N.I. Antoshchenko and B.A. Inyushin, pp 29-30]

[Text] Degasification of a mine section after abandonment of the working face. Suggestions for the adoption of measures to combat gas generation in worked-out sections. 2 illustrations; 1 reference.

UDC 622.232:553.94:[552.578.1:550.343.6](477.62)

#### ON FUMAROLE DANGER IN MINES IN THE KRASNOARMEYSK REGION OF THE DONETS COAL BASIN

[Synopsis of article by A.A. Golubev, pp 30-31]

[Text] The development of fumaroles, techniques for predicting them and the prediction of dangerous zones for fumaroles.

UDC 616-036.1.82:622-057.5

#### EFFECTIVENESS OF METHODS FOR PHYSIOLOGICAL LABOR REHABILITATION OF MINING WORKERS AFTER AN ILLNESS

[Synopsis of article by A.V. Kal'yanov, pp 32-33]

[Text] Evaluation of the effectiveness of different labor conditions for mining workers after an illness. Suggestions for the successful rehabilitation of workers after temporary incapacity for work.

UDC 622.413:536.244

#### CALCULATING MOISTURE CONTENT DURING LOCAL COOLING OF THE AIR

[Synopsis of article by L.B. Zimin, pp 33-34]

[Text] Special features of the process of cooling air in mines. Recommendations for calculating moisture content after the air has passed through the cooler. 1 illustration; 1 reference.

UDC 622.011:550.832.73

#### GEOLOGICAL AND GEOPHYSICAL DATA FOR PREDICTING BED DEVELOPMENT CONDITIONS IN THE WESTERN DONETS COAL BASIN

[Synopsis of article by L.M. Chernenko, pp 35-36]

[Text] Results of the use of geological and geophysical data for predicting the mining conditions for the development of coal deposits in the Western Donets Coal Basin. Prediction techniques. Evaluating the accuracy of prediction data. 2 illustrations.

UDC 553.93:552.578.14(477.62):622.01

#### NATURE OF THE PRESSURE OF FLUIDS IN COAL BEDS

[Synopsis of article by V.I. Dokiyeenko and L.A. Nashkerskiy, p 37]

[Text] Factors creating pressure in the space under the packer in a bed tester and in the sealed chambers of underground holes. 1 table; 2 references.

UDC 622.794.42

#### DRYING COAL IN A FLUIDIZED BED

[Synopsis of article by A.M. Kotkin, Yu.M. Rubin and G.V. Alekseyev, pp 38-39]

[Text] Results of introduction of drying units with fluidized beds at the "Sverdlovskaya" Central Concentration Plant. Some measures making it possible to eliminate water vapor condensation in the drying line. Comparison of specifications of drying unit having a fluidized bed with a drying drum 3.5 m in diameter. 1 table; 1 illustration.

UDC 662.741.3.022:622.01

#### MODERNIZED DRUM DRYER FOR CONCENTRATES OF COKING AND ENERGY COALS

[Synopsis of article by A.V. Lobanov and S.G. Pavlyuchenko, pp 40-41]

[Text] Analysis of causes of unsatisfactory operation of series-produced drum dryers with leaf-shaped fins. An original chain-type fin unit that insures the

exposure of the interphase surface of products and an improvement in drying efficiency. 3 tables; 2 illustrations; 1 reference.

UDC 622.7:658.562"313"

ANALYSIS OF TENDENCIES FOR CHANGES IN THE ASH CONTENT OF COAL--A BASIS FOR  
PREDICTING THE OUTPUT OF ENRICHMENT PRODUCTS

[Synopsis of article by G.L. Maydukov, pp 42-43]

[Text] Results of a retrospective analysis of ash content and the output of coal enrichment products at concentration plants in the Ukrainian SSR, mathematical models of time series, and prediction methods and results. 3 tables; 2 illustrations.

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## NON-NUCLEAR POWER

### KHARKOV TURBINE PLANT'S ACHIEVEMENTS OUTLINED

Kiev PRAVDA UKRAINY in Russian 29 Apr 84 p 3

[Article by A. Bugayets, secretary, party committee of the Karkov Turbine Plant's Nuclear Turbine Construction Production Association: "Increasing the Power Potential"]

[Excerpts] The Nuclear Turbine Construction Production Association Kharkov Turbine Plant imeni S. M. Kirov is celebrating, its 50th anniversary. Today this enterprise determines the development of the country's atomic energy. It began as the acknowledged center of turbine construction and insures the solution of the problems of increasing effectiveness of fuel-energy complexes and further increasing the energy potential of the country.

The primary model of a 1,000,000 kilowatt turbine, in which the newest achievements in the field of science and technology and progressive technological solutions are incorporated, was manufactured in April of 1980. In a single turbine alone, the million kW unit is as powerful as all the power stations of pre-revolutionary Russia.

At the end of December, 1983, the world's largest atomic mass, with a power of 1,500,000 kilowatts with two turbines was started up with a full industrial load at the Ignalinskaya AES.

The association also successfully solves hydraulic turbine problems. The pride of the Kharkov turbine builders is a series of high-pressure radial-axis hydraulic turbines of great individual capacity for the Nurekskaya, Ingurskaya, Chirkeyskaia and Kurpsayskaya hydroelectric power plants, the world's largest industrial series of horizontal capsule hydraulic turbines for the Kiev and Kanevskaya hydroelectric power plants, and turbines for export to socialist and capitalist countries, as well as unique ball and disk gates. Today, more than 160 of the power plants of the Soviet Union and also 21 countries of Europe, Asia, Africa and America are equipped with Karkov turbines and hydraulic gates.

Within the association labors a collective of many thousands of highly qualified workers, engineers and technicians. This collective collaborates with more than 90 scientific, research and planning institutes, including the In-

stitute of Electric Arc-welding imeni E.O. Paton, an Ukrainian SSR Academy of Sciences; the Institute of Machining-Building Problems an Ukrainian SSR Academy of Sciences, the Central Boiler and Turbine Institute imeni I. I. Polzunov, the Kharkov Polytechnical Institute imeni V. I. Lenin, etc. As a result of this collaboration many complicated problems connected with the development of new powerful turbine installations for hydraulic, gas, thermal and atomic power plants were solved.

Having stepped forward together with the other leading enterprises of Kharkov as an initiator of the competition "A Five-Year Plan Without Increasing Reserves," the turbine-builders are striving not only to insure the unconditional fulfillment of tasks in the 11th Five-Year Plan, and the Power Program as a whole, but also to utilize on-hand reserves to significantly overfulfill the set tasks. Over 3 years of the five-year plan the collective confidently increased the growth rates of all technical and economic indicators and marked its anniversary with excellent results: the sales volume of products was increased by 30.2 percent, and labor productivity grew by 26.3 percent. In accordance with the agreed-upon commitments, equipment was delivered to the country's most important construction sites either on time or ahead of schedule. This included delivery of 1,000,000 kilowatt turbines to the Yuzhno-Ukrainskaya, Zaporozhskaya and Balakovskaya AES's, a 750,000 kilowatt capacity turbine to the Ignalinskaya AES and a 500,000 kilowatt turbine to the Smolenskaya nuclear power plant.

Our collective began the final year of the 11th Five-Year Plan with great enthusiasm. The December 1983, February 1984 and the April 1984 CPSU Central Committee Plenums and addresses by the General Secretary of the CPSU Central Committee, K. U. Chernenko gave us the impetus for new efforts. Responding to the decisions of the Plenums, the collective of the association accepted these additional obligations: to increase above-plan labor productivity in the fourth year of the five-year plan by 1 percent, and a reduction of production cost by 0.5 percent. And the word of the collective is its bond.

\* \* \*

For great contributions to the development of atomic turbine construction and supplying domestic AES's with progressive energy equipment, the association collective was awarded the Order of the October Revolution. The minister of Electric Power Machine Construction USSR, V. M. Velichko, affixed the high award to the collective's banner in a solemn ceremony yesterday.

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## NON-NUCLEAR POWER

### LENINGRAD METALLURGY PLANT TO PRODUCE HIGH-SPEED TURBINES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA 1 Apr 84 p 1

[Article by E. Levshukov: "Million kW Unit: 3,000 RPM"]

[Text] They are testing the high-speed turbine! In an instant, news that the million kilowatt turbine for the Rovenskaya AES was being tested flew around the Leningrad Metallurgy Plant. Indeed, this was an examination for the entire collective of metal workers. Of course, a machine of equal power already exists: last year the Kharkov Turbine Plant had shipped its million kW unit to the Yuzhno-Ukrainskaya AES. But for the Leningradians it was something special.

And so, in the vast shop to match the machine, the pre-startup hustle and bustle was finished. Alongside the turbine, at the test stand, were the designers, shop specialists and commission members. Startup--and for several moments there's a remarkable silence. It is difficult to imagine the force of the steam that rushes at the turbine vanes. Filled to overflowing with that power, the body of the machine shuddered slightly. Under the rapidly swelling roar, the tachometer came to life. All eyes were now on this revolution monitor. Three hundred. Five hundred. One thousand revolutions per minute.

The testers' attention also markedly increases. The maximum limit--1,500 revolutions--has been passed, but there is still as much again to go, until the working level of the Leningrad "high-speed turbine" is reached.

The Leningradians have set a bold task before themselves: using extremely high steam pressure to cause the shaft of the turbine rotor to revolve with doubled speed, and thus to reduce the machine's weight by ten tons to make it compact and easier to manufacture and assemble. However, bringing the design plan to reality required, in essence, novel technical solutions. For example, a welded rotor could no longer guarantee the required dependability; it had to be manufactured from a solid billet. Experiments revealed that traditional materials were not suitable for the vanes. This quest led to use of titanium.

Allied enterprises joined in the development of this unique machine: the Izhorskiy Plant Production Association imeni A. A. Zhdanov, a turbine vane plant and scientists of a number of institutes. The most desirable elements

and the reliability of received design solutions were repeatedly checked, and the most important sub-assemblies were tested separately. But how would they perform under full load conditions?

The engineers listened intently to the "heart" of the turbine with the aid of an instrument which is a little like a stethoscope. The monitor reads 3,000 revolutions per minute: operating speed. The vanes of the so-called final stage are subjected to unheard of stresses--they are rushing at twice the speed of sound. Will they pass the test?

The faces of the testers, however, are relaxed and confident: everything is within the limits of the norm. The figures are noted down from the monitors. The test stand, which is the pride of the plant, makes it possible to check the turbine according to the most important indicators and parameters. This means that any deviations which are discovered can be immediately eliminated.

But now there are no such deviations. Tests of the unique machine conclude successfully. It was accepted by the commission with a rating of "excellent." Ahead of the Leningradians there is a new stage--serial production of these high-speed turbines.

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## NON-NUCLEAR POWER

### SUBSTITUTING GAS FOR MAZUT AT ELECTRIC POWER PLANTS

Moscow SOTSIALISTICHESKYIA INDUSTRIYA in Russian 14 Apr 84 p 2

[Article by S. Borisova, correspondent of USSR Minenergo press-center: "Gas Instead of Mazut"]

[Text] The current year has been a special one for the Konakovskaya GRES [State Regional Electric Power Plant]. It is one of 20 thermal electric power plants that is being converted to a new type of fuel: instead of mazut these power generation facilities will be using Urengoy gas. How is the collective of this plant doing in fulfilling the objectives set before it?

To date the basic fuel for electric power plants has been mazut. Small amounts of gas have been involved in the generation of electric power as a reserve fuel. Tank cars with mazut have a long road to travel before the mazut finds its way to the furnaces of boilers. Every day 32 trains, representing 1,600 tank cars, leave the oil pumping stations of Ufa for this purpose. Every day the energy generation units at the Konakovskaya GRES require 12,000 tons of mazut. Delivery is expensive, and moreover these trains with liquid fuel overload the railway system. But the main point is that the furnaces are burning not only a fuel, but an irreplaceable and expensive chemical raw material.

The director of this power plant, I. Sychev, points to the plan for the future supplying of the GRES with gas. A branch line more than 80 kilometers long stretches from the Ukhta-Torzhok Main Line to the Konakovo Distribution Station. Seven hundred thousand cubic meters of Siberian gas will eventually flow into the boiler furnaces, which from that time will work completely on gas.

"The conversion of this plant to the burning of gas will free up about 3 million tons of mazut for the national economy in 1985 alone," noted I. Sychev. "Moreover, it will significantly lighten the traffic on the railroads and have a beneficial effect on the air quality of our kray. By burning gas we can avoid the need to construct expensive desulfurization units which would be necessary if we were to continue to use mazut. This will allow us to further conserve our resources."



The design documentation for converting this electric power plant to gas was prepared by the Moscow division of Atomteploelectroproyekt Institute. It was a big job that had to be completed under tight deadlines. Nevertheless, the designers accomplished the task within the set time frame.

The builders then set to work: construction of the gas distribution station and laying of the gas pipeline was initiated; the pipelines will deliver the gas directly to the boilers.

While the design work was being completed, and the coordination and construction preparations were underway, the operators were not sitting on their hands but were contributing to the design, making their own proposals to aid in the search for more economical solutions. For instance, when large volumes of gas are delivered, there must be centralized control over consumption patterns. As requested by the power generation workers, the designers provided access to all essential information and all means of remote control from control panels. This was done to facilitate monitoring and provide reliability and convenience. One more suggestion of the operators promises significant savings: they requested that the design include facilities for the qualitative analysis of gas. In these facilities, special equipment will be used to determine the density, caloric content and other properties of the arriving gas. This is essential to avoid conflicts when settling accounts with suppliers.

Currently, preparations for accepting the new fuel are proceeding at full speed at the GRES. The major user of the gas will be the boiler-turbine complex.

"For the time being we continue to operate in our usual manner," says G. Luk'-yanov, division foreman. "The conversion of equipment to burn gas requires a certain amount of restructuring from all personnel--power unit machinists, engine room patrols, shift foremen. Work in the initial stages will be especially stressful. For this reason the preparation of the station is not a matter solely of technical measures. It above all involves work with people.

Today the second shift is working in the division, headed by communist V. Razumov. During 1983 this shift has repeatedly won first place in competitions among power plant employees. This shift alone has accounted for more than 900,000 tons of conserved fuel. Now it has added to its usual daily tasks technical training, and exercises on simulators. Their objective is to increase the level of training of personnel, so that personnel operating in a situation of rapidly changing gas properties will be able to maintain normal equipment operation, and supply the maximum possible amount of electricity (while burning the least possible amount of fuel).

"Our ministry has done a lot of work on the conversion of a number of thermal electric power stations to burn gas," V. Lukin tells us, who is the deputy minister of power and electrification of the USSR. "I can already tell you about our first successes. Work has been completed on the Karmanovskaya Zuyevskaya and Uglegorskaya GRES, and on a number of thermal electric power centers. Construction has been completed on gas pipelines for the Kharkovskaya TES [Thermal Electric Power Station]-5, the Nizhenkamskaya TES-1, the Permskaya TES-9 and others. The conversion of these power stations to gas will free up

about 6 million tons of heating mazut in 1984. Gas pipelines are scheduled to be built this year to another 15 power plants. Strict controls have been established to hold to the schedules for these projects. The ministry has set up an operations management center."

The laying of gas pipelines is a new matter for energy industry construction workers. The pace of construction reflects both the lack of experience and the lack of specialized equipment: pipelayers, insulating machines, pipe carriers. It is our hope that the planning organs will find it possible to provide this sector with all that it needs to successfully complete its important tasks.

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## NON-NUCLEAR POWER

### BRIEFS

POWERFUL GENERATORS FOR LITHUANIA--(TASS)--Ukrainian scientists and manufacturers have begun assembly of the most powerful power generation machines in the country for hydroelectric pumped storage power plants. At the Kharkov Electrotiyazhmash plant assembly has begun on the units of the first mass produced generator with a capacity of 220,000 kilowatts. It will be installed at the Kayshyador hydroelectric pumped storage power station in Lithuania. [Text] [Moscow IZVESTIYA in Russian 1 Apr 84 p 2] 9276

TURBINE ASSEMBLY AT ANGREN--Angren (Tashkent Oblast) (TASS, 10 March)--Assembly has begun on the first turbine unit of the Angred GRES-2. A total of eight 300,000 capacity units are to be installed at this thermal power plant which will use the coal of the Angren basin as fuel. Builders have promised to complete the first of these units by September, 3 months ahead of schedule. [Text] [Baku VYSHKA in Russian 11 Mar 84 p 1] 9276

PRESSURE TUNNEL CONSTRUCTION BEGINS--Makhachkala--Manufacturing has begun on sections of a pressure tunnel pipeline for water for the Matlinskaya GESV, through which water will flow to the units from the high elevations of Sulak. The hydrobuilders used the technique of accelerated component assembly for this steel river bed, using special stands. This technique guarantees high quality welded seams and makes it possible to complete the work three times as fast. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian, 6 Apr 84 p 1] 9276

TAIGA GETS POWER LINE--The first towers of the Tymovsk-Aleksandrovs-Sakhalin high voltage power line now stand over the taiga. The line will deliver electric power to coal mining, timber processing enterprises and marine ports on the north-western part of Sakhalin. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 20, May 84 p 2] 9276

TURBINES ASSEMBLED AT SVERDLOVSK--The collective of the first mechanical assembly division of the Sverdlovsk Motor Turbine Plant Association imeni K. Ye. Voroshilov manufacturer turbines of varying capacities for electric power stations under construction throughout the country. Currently it is assembling turbines for the Krasnoyarsk TES-2, the Moscow TES-26 and other plants. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 31 Mar 84 p 1] 9276

KAYSHYADORSKAYA HYDRO CONSTRUCTION BEGINS--Kruonis, Lithuanian SSR--The first cubic meter of concrete has been poured for the plant building at the site of

the Kayshyadorskaya hydroelectric pumped storage power plant. This construction project represents an important component of the power generation program. This hydroelectric pumped storage electric power plant will work at the same time as the more powerful Ignalina Nuclear Power Plant, thereby assuring the continuous and economical operation of the nuclear power plant. [Text] [S. Borisova, USSR Minenergo press center correspondent] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Apr 84 p 1] 9276

AMUR OBLAST POWER LINES--Blagoveshchensk--The first towers of a high voltage LEP [Long Distance Electric Power Line] have been erected near the taiga settlement of Novokieyevskiy Ural in the northern part of the Amur Oblast. The builders of Dal'elektroset'sstroy are involved in the construction of a 170 kilometer main power line to Fevral'sk--the biggest settlement along BAM. This will be the third energy bridge over which current from the Zeyskaya GES reaches the central portion of the main rail line. Earlier, such 220 volt LEP were run to Tynda and to Zeysk. [Text] [Baku VYSHKA in Russian 11 Mar 84 p 1]

RAZDAN GRES MEETS TARGETS--Razdan--The Badge of Honor collective of the Razdanskama GRES imeni 50th Anniversary of USSR has successfully fulfilled and ahead of schedule, all of its objectives for the first 2 months of this year. The role of this plant in the development of the Armenian power system is inestimable. In the past year the Razdan plant accounted for 60 percent of all the electric power generated in the republic, making it possible to reliably provide electric power to hundreds of plants and factories, construction sites and organizations in Armenia. The slogan that resounded from the podiums of the 26th CPSU Congress, "The Economy Should be Run Economically" became the action program for the power industry workers at this plant. Last year alone at this GRES 3,580 tons of standard fuel were saved which converts into 5 million kilowatt hours of electricity. The plant employees have set even higher conservation targets for this year. [Text] [N. Ordiyan, special correspondent] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Mar 84 p 1] 9276

SPANDARYANSKAYA GES CONSTRUCTION PROGRESS--Hydrobuilders in Armenia achieved a major victory in their work in honor of the first of May: they completed drilling a pressure tunnel for the Spandaryanskaya GES that is under construction. This plant represents the third step in the power generation cascade on the Vorotan River. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 18, Apr 84] 9276

TURBINE ASSEMBLY ON SAKHALIN--Turbine assembly has started at the largest construction project on Sakhalin, the second stage of the Yuzhno-Sakhalinskaya TETS [Heat and Electric Power Station]. The second stage of this TETs will be placed under load in September. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 18, Apr 84] 9276

GES CONSTRUCTION AT ENIKEND--Enikend (Azerbaijan SSR)--The full utilization of the power of the Kura River will be facilitated by the Enikend GES, the construction of which has begun in Azerbaijan. Yesterday the first cubic meters of earth were removed from the foundation pit under the dam. The Enikend GES will become the second step in the developing Central Kura Cascade, the first step being the Shamkhorskaya hydroplant which is already operating. The capac-

ity of the new GES is 150,000 kilowatts, which will make it possible to improve the supply of electric power to Kirovabad, the second largest city in Azerbaijan, and the agricultural regions in the western territories of the republic. [Text] [Moscow TRUD in Russian 8 Apr 84 p 1] 9276

ENERGY MANAGEMENT IMPROVED--Saransk--A new supervisory control board has become operational in Saransk, at the Mordovenergo Enterprise of the regional electric power network administration. Outfitted with modern equipment and telemetric capabilities, it assures regular electric power supplies to seven administrative regions and the capital of this autonomous republic. [Text] [A. Gabunova] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Apr 84 p 2] 9276

SHAPSHA RIVER POWER PLANT STARTED--Leningrad--During the day electric power is used unevenly. At night far less of it is necessary. What should be done with the excess? Experts have developed different means for accumulating it. The most effective are pumped storage hydroelectric power plants, which work as follows: at night the surplus electricity is used to pump water into a huge reservoir. When peak consumption occurs this water is passed back through hydroturbines, producing electric power. This is precisely the principle which will be used by the pumped storage GES the construction of which has been started by the workers of Leningradenergospetsstroy. The region of the Shapsha River was chosen for siting this GES. A reservoir with a capacity of more than 70 million cubic meters will be built on an elevated plateau. A watershed on the Shapsha River approximately 27 kilometers long will become the water storage source that will fill the reservoir at night. The eight generating units to be installed here will work as transfer pumps at night and as hydrogenerators during the day. The total designed capacity of the machinery at this pumped storage station is more than 1.5 million kilowatts. [Text] [V. Yurasov] [Moscow GUDOK in Russian 20 Apr 84 p 2] 9276

ANDIZHANSKAYA GES COMPLETED--Sovetabad (Andizhan Oblast)--The final units of the Andizhanskaya GES, the third and fourth, have begun to operate. All four units of this new hydroelectric power plant have a capacity of 140,000 kilowatts, which are now surging, like a river of power, into the unified Central Asian power generation system. So, if prior to the full completion of construction of the complex its first two units were producing more than 200,000 kilowatt hours of electricity, then the capacity has now doubled. A workers' relay race greatly helped the construction of the hydroplant. Delegates from all the fraternal republics as well as fighters from international student detachments participated in this shock construction project. Materials came from all over the Union as well: turbines from Kharkov, generators from Vovosibirsk, transformers from Togliatti. The plant-suppliers assisted in the assembly, pre-operational testing and the startup of the new GES. The erection of the well organized and modern city of Sovetabad, whose name means "The Flowering of the Soviets," was also the product of joint efforts. [Text] [Sh. Zaynutdinov] [Moscow STOITEL'NAYA GAZETA in Russian 6 Apr 84 p 3] 9276

SYRDAR'INSKAYA GRES TOPS 100-BILLION KW--Shirin (Uzbek SSR)--The collective of the Syrdar'inskaya GRES imeni 50th Anniversary of the USSR has just produced

its 100 billionth kilowatt hour of electricity since the startup of this power plant. Today the 10 energy generating units of this GRES deliver more than one third of the electrical energy generated in the republic. This electricity is used to develop lands of the Golodhaya, Dzhizakskaya and Karshinskaya steppes. [Text] [R. Tell'] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Apr 84 p 1] 9276

CSO: 1822/274

## PIPELINE CONSTRUCTION

### DEPUTY MINISTER ANDREYCHEV ON RESOURCE CONSERVATION POLICY

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 2, Feb 84 pp 2-4

[Article by Yu. V. Andreychev, deputy minister, Minneftegastroy [USSR Ministry for Construction of Oil and Gas Facilities]: "Technological Policy on Resource Conservation in Oil and Gas Construction"]

[Text] An important trend in the steady growth of the national economy, as outlined by the 26th CPSU Congress, is the acceleration of its shift to an intensive path of development, more efficient use of existing production capacity, and the comprehensive conservation of material, labor and financial resources.

At the present time conservation and a zealous commitment to the national welfare have become the critical conditions of the implementation of plans for the economic and social development of our country.

In his speech at the November 1982 CPSU Central Committee Plenum, Comrade Yu. V. Andropov emphasized that the successful fulfillment of national economic plans depends on the success that is achieved in meeting set conservation targets, and the degree to which such issues become a matter of daily concern for every worker.

The June 1983 Plenum of the CPSU Central Committee pointed out the next goal: above all "...to put our existing facilities in order, and to assure the more sensible utilization of the productive, research and technical potential of our country...."

The December 1983 CPSU Central Committee Plenum also paid considerable attention to the efficient utilization of existing resources.

The problem of conservation and careful resource allocation is particularly pressing for capital construction, which is one of the largest consumers of material and technical resources.

Each year our country allocates for capital construction needs 126 million tons of cement, 18 million tons of rolled metal, 105 million cubic meters of timber products, 250 million cubic meters of concrete and reinforced concrete products and structures, 260 [million] square meters of window glass and other products, together amounting to a sum of some 50 billion rubles.

Plans for construction and assembly work, unfortunately, do not always fully provide for a certain types of materials. At the same time, inventories of manufactured commodity stocks exceed established guidelines.

Many construction sites experience significant losses of construction materials, structures and components. Substantial resources are expended in eliminating shoddy workmanship, designer errors and other consequences of sloppy management.

Overall, losses resulting from the inefficient utilization of material resources in construction amount to almost 2 billion rubles annually.

A reduction in these losses, and the economical construction of resources is a task of immense importance for the national economy.

The state allocates significant material and technical resources for the construction of facilities for the oil and gas industry. In 1984 alone this sector will receive more than 6 million tons of pipe, 3 million tons of cement, and about 2 million tons of refined petroleum products. Consequently, the efficient utilization of these resources takes on top priority significance.

Within the Minneftegazstroy system large scale operations are under way for the conservation and effective utilization of raw material, fuel and power, and other material resources.

This sector has implemented a set of scientific, technical and organizational measures directed both at the development of management by objective systems, and the administration of projects related to resource conservation, as well as for the formulation of a scientific and technical policy for the development of means and techniques for resource conservation.

At present implementation is proceeding of the plan, and the organizational and technical measures for the conservation of material, fuel and power resources that were projected for the 11th Five-Year Plan. By 1985 the percentage savings realized by this sector should reach (in percent): rolled ferrous metal products, 7.5; cement, 6; timber products, 8.9; thermal energy, 3.5; electric power, 12; gasoline and diesel fuel, 16.

Based on the approved plan and the organizational and technical measures for the conservation of material and fuel and power resources for the 11th Five-Year Plan, the applicable directive targets for the reduction in mean consumption norms for important types of materials are set annually for the major administrations and enterprises. Norms are also developed for the consumption of fuel and power resources in the main areas of their allocation.

Material and fuel resource funds for subdepartmental organizations are allocated taking into account existing objectives and norms, as well as the necessity for involving in production excess inventories and remaining commodity goods.

To improve the sectoral adherence to norms, implementation is proceeding of a "Priority Program for the Comprehensive Development and Introduction of a Uniform Sectoral System of Technical and Economic Norms and Standards."



The organization of a goal-oriented program to administer conservation of resources within Minneftegazstroy has made it possible to make these projects more targeted and planned, thereby increasing the specificity of objectives and their effectiveness.

Based on advanced experience, new technology and techniques in the production of engineering-assembly tasks, and the study of analogous situations in related fields, the ministry is implementing a goal-oriented scientific-technical policy in the area of conservation of materials, fuel and power resources.

The basis for the formulation of the scientific and technical policy of Minneftegazstroy in the area of the effective utilization of material fuel and power resources are the appropriate resolutions of the ministry boards, the findings of sectoral scientific research, fabrication, and design organizations, as well as the general engineering guidelines of USSR Gostroy for the fulfillment of progressive, resource conserving measures.

Organizational and technical measures for achieving planned conservation are being implemented comprehensively with three basic objectives: the upgrading of facility design, design techniques and calculation methods; the upgrading of technical procedures, the forms and techniques for the organization of the construction industry; the introduction of economical types of materials and substitutes.

A major achievement in the effective utilization of material-technical resources was the design and construction, approved on the initiative of the ministry, of a main gas pipeline network from the northern part of the Tyumen oblast to the center of the country in a single corridor, with an increase in the share of 1,420 millimeter pipelines constructed. This will save the national economy many hundreds of tons of metallic pipe, will result in the use of greater capacity power motors at gas pumping stations, and the wide application of modular unit construction techniques.

In its work to document the trends and factors in the achievement of the target numbers established by USSR Gosplan, for Minneftegazstroy, the sector is first guided by the standard industry-wide list of organizational and technical measures that include an extensive listing of progressive recommendations for upgrading design resolutions, the organization and techniques of construction and assembly work, as well as the introduction of effective materials, substitutes and structures.

Minneftegazstroy's scientific research and design organizations are carrying out, in conjunction with organizations of Minnefteprom [Ministry of the USSR Oil Industry] and Mingazprom [Ministry of the Gas Industry] purposeful work to improve volume and planning decisions. At the same time they are working with organizations of the manufacturing ministries to develop miniaturized equipment with a high unit power rating.

The ministry is devoting substantial attention to an appraisal of the designs submitted to it, identifying within them the degree of application of progressive volume and design features, effective structures, materials, substitutes,

etc. When its capital construction projects are evaluated and the approved general plan design, as well as the progressiveness of architectural and structural treatment of buildings is analyzed, a great potential to save on rolled ferrous metals, cement, logs, metal pipe, bricks, etc, is uncovered.

Radical changes in the organization of the construction industry are also having an immense impact on the effective utilization of material and technical resources.

The contract brigade method has become widely used in this sector. Spreads organized on a contract brigade basis combined with the Shchekin method are proving highly effective. Their experience, which was gained during the construction of the Urengoy-Uzhgorod gas pipeline, is being disseminated at other right-of-ways.

Fundamental changes in construction techniques for compressor stations and other surface facilities are tied to use of modular units in construction.

Within this sector an experimental association has been set up and is being further developed. Called Sibkomplektmontazh, it produces modular units, and supplies of all related components and assemblies, in West Siberia. Modular units for facilities built in the European zone are manufactured and delivered by assembly enterprises located in Shchelkov, Novocherkassk, Kiev, Orenburg, Almeteyevsk, Ukhta and Ufa.

By 1985 the output of these modular blocks will exceed 6,000 pieces. A two fold increase is planned in the production of modular prefabricated buildings (SKZ) and of worksite living complexes (VZhK). The manufacture of pipe terminals compressor station and for linear pipelines will increase by a factor of three. The output of fastening components for pipelines will increase by a factor of more than 1.5. The share of modular production will increase at all enterprises.

This list of materials-saving scientific and technical developments that have found application in pipeline construction could be continued.

The conservation of fuel and power and material-technical resources is in the mainstream of scientific and technical progress in this sector. Therefore it is not a one-time objective, not a product of market conditions, but the very basis of the development of new technologies, new engineering structures and machines which must be present in the work of scientific and design institutes and construction organizations.

More and more attention is being voted within this sector to conservation in the use of rolled metal products, cement, forest products and fuels and lubricants.

A reduction in the use of metal which, as is well known, occupies a place of considerable importance in our country's economy, has special significance. This is precisely the material which defines the power of our state, and the potential of heavy industry.

Ministry enterprises make extensive use of prestressed load-carrying structures and large-panel enclosure elements, wide-width, thin-walled rolled metal, roll-formed sections for metallic structures, low-alloyed steel, and efficient reinforcement for reinforced concrete. The production volume of metal structures at special enterprises of the sector will increase from 55 percent (the base year of 1981) to 66 percent in 1985. This will result in a reduction in the metals intensiveness of production, increase the volumes of economical location and spacing of steel plates and the utilization of leftover ferrous metal rolled stock.

At the Novosineglazov Structural Parts Combine, manufacture of stamped-welded tees with a diameter in excess of 530 mm instead of rolled-welded tees makes it possible to save 15-18 percent of rolled sheet stock.

In Glavneftegazstroymekhanizatsiya and at Soyuzremonttruboprovodtekhnika, based on the generalized experiences of machine-building factories and equipment repair plants, measures have been developed and are being implemented to increase the utilization of ferrous metal rolled stock by 3-5 percent. Parts are recycled by resurfacing them with high strength metals.

Within the sector measures are being taken to reduce the metal content of manufactured machinery and equipment at construction and design organizations, to maximize the use of durable properties of a metal and take into account the actual operating conditions of equipment, and structural elements, progressive standards and calculation techniques are being used (computer based). The new machines with a reduced metal content include: the MM631 assembly machine with extendable track propulsion and a lifting capacity of 63 tons, and which provides savings of 56 tons of metal for the assembly and stacking production line; the VAG 207 anchor rotator--which saves 1 ton of metal per machine; the PB 203 pipe-carrier based on the KRAZ-260 truck, and a lifting capacity of 25 tons--a reduction of the specific metal content from 0.9 t/t to 0.8 t/t (in comparison with other pipe carriers).

The series of adopted measures made it possible to save more than 20,000 tons of rolled metal stock in 1983 alone. During this year this project should be significantly expanded both to search for new technical resolutions and to seek the efficient, careful utilization of rolled metal stock via day-to-day operations of industrial enterprises and construction organizations. Only the joint work of scientific, engineering and technical workers, and of all the employees of the sector will make it possible to fulfill the increased targets for resources conservation contained in the State Plan for the Economic and Social Development of the USSR in 1984.

Great attention is being paid to cement conservation. In this regard, the high strength, light concretes manufactured at branch enterprises are very effective. New types of foundations are being widely used (pile footings in particular) and also new bearing elements for buildings. The channelless installation of intra-site service pipelines has become widespread.

At building products enterprises the use of plasticizing additives along with hardening agents and high quality inert materials are being used to reduce cement use.

Ballasting pipelines with rock and use of nonwoven synthetic materials yields savings of 30 kilograms of metal and 220 kilograms of cement per meter of pipeline. A significant reduction in the use of cement has been assured by the use of anchoring devices instead of concrete weighting materials to stabilize pipelines. For instance, the use of a single pair of anchors instead of two sets of weighting materials makes it possible to save about 1,100 kilograms of cement.

The startup of a clinker division at the Nadym Homebuilding Combine offers the possibility of producing up to 100,000 tons of cement per year right at the site where it will be utilized. This will make it possible to eliminate the inevitable losses of cement during transport over long distances. Construction is being completed in Surgut on a division for the production of azerite which will make possible significant savings of cement in housing construction.

At the same time, there are significant losses of cement in many ministry organizations particularly during transportation and storage. Current production standards do not always motivate builders to take full advantage of existing possibilities to conserve it.

A great deal is being done in this sector to facilitate the effective utilization of timber products. Wood harvested from clearing of oil and gas pipeline right-of-ways is being broadly utilized. Glavvostoktruboprovodstroy alone used 21,000 cubic meters of this type of work in 1983.

To reduce outlays of timber products, inventory check points have been set up on temporary roads, unseasoned sawn timber and fiber board panels are used for pipeline linings, wood wastes are being put to use to fabricate supplementary wood products, and linoleum is being used more extensively in place of plank floors, etc.

The work of ministry organizations to implement the directive of the CPSU Central Committee and the USSR Soviet of Ministers concerning an increase in the efficiency of use of automotive transportation resources and the assurance of the safe storage of fuel and lubricants has already shown in its first months that there are significant opportunities within the sector to conserve fuel.

A major source of improvement in fuel management is the introduction of progressive shipping techniques, an increase in the specific weight of centralized, containerized and boxed shipments, as well as the shipping of goods by trailer trucks. As a result of their further implementation savings of 7,400 tons of gasoline and 3,500m tons of diesel fuel are projected.

Optimizing the composition of the automotive fleet is of great importance, and should be aimed at increasing the number of medium capacity trucks. The percentage of diesel vehicles in the fleet, which burn one-half the fuel per ton-kilometer than gasoline powered vehicles should also be increased.

For the 11th Five-Year Plan, a 4 percent increase in the productivity of gas-powered vehicles is projected within this sector (in ton-kilometers of travel), while diesel vehicles are to increase by 4.5 percent. These measures will

make it possible to save 14,500 tons of gasoline and 7,200 tons of diesel fuel respectively.

Prompt inspection of the technical condition of the fleet should have a significant impact on automotive fuel conservation. To aid in this, technical diagnostic stations for automotive vehicles should be set up at fleet terminals.

Energy conservation technology is being systematically implemented at sectoral enterprises of the construction industry. These include the thermal processing of reinforced concrete using natural gas combustion byproducts (savings of 40-50 cubic meters of gas per cubic meter of reinforced concrete); the rotor-pulse technique for the preparation of shallow-dispersed mixtures of mazut, the replacement of cables with too small cross sections, making it possible to reduce losses of electrical energy. Strict controls have been established for the delivery of steam chambers and in thermal insulation improvements of the chambers at plants manufacturing reinforced concrete products, as well as adherence to deadlines for the conduct of planned-preventive maintenance of thermal power equipment.

Unfortunately, the conversion of boilers in residential areas and enterprises to gas is taking place very slowly. And in fact the conversion taking place in organizations located in western Siberia alone is freeing up many thousands of tons of diesel fuel.

In the multi-faceted work of ministry organizations on the conservation of all types of materials, priority importance is accorded to the effort for the rational use of pipe, and assuring its safety during transportation, warehousing and construction.

The ministry board has obligated the collectives of all subdivisions to put this important state matter in order in the shortest possible time.

Within the sector, a program is being implemented to upgrade the systems for the delivery and use of pipe at organizations and enterprises. A number of changes and amendments have been added to normative documents on the receipt, transportation and warehousing of pipes, with a view to the practical working conditions of sectoral organizations. The availability of new cargo-handling equipment has made it possible to improve the neatness of pipe stacking. A significant improvement in the safety of pipe during transport has been achieved by shipping them via the North Sea route. In 1983 alone 258,000 tons of pipe were shipped this way.

The ministry board, the main administrations and enterprises are carrying out continuous control over pipe utilization. Individuals convicted of violating established procedures are subject to discipline and economic sanctions.

The payment of bonuses for facility startups, as well as for results of managerial activity in a given year is stipulated only when all measures for the efficient utilization of pipes and other materials are fulfilled. The fulfillment of these measures is taken into account during the tallying of socialist competition results.

The program for the training and skill enhancement of the work force includes a section on the careful handling of pipes and their economical utilization.

The Minneftegazstroy board approved in November 1983 measures related to the completion of shipment of pipes and equipment remaining at completed construction sites. Managers of the pipeline trusts must take additional measures to assure the unconditional fulfillment of the board's resolutions. It is necessary to observe a strict order in accordance with which the purging or the flushing of completed pipelines can take place only when any remaining pipes have already been transported from the right-of-way.

Inspections made recently have shown that along with positive efforts to assure the efficient use of pipe, inefficient and uneconomical handling of pipe has not been eliminated at certain organizations. In a number of trusts and construction-assembly administrations there is a low level of professional discipline. Orders and directives from the ministry for establishing order in the use of pipes have not been immediately implemented by those immediately responsible.

The resolution, however, of this matter of state importance is possible only if every individual, from the senior managers to the workers, strictly adheres to the approved system for the allocation, warehousing, and transportation of pipe.

Nineteen eighty-four will be a critical year for this sector. It is faced with the task of completing and making operational 10,500 kilometers of gas pipeline, 3,400 kilometers of crude oil and petroleum product pipelines, 83 compressor and pumping stations.

In his speech at the December 1983 CPSU Central Committee Plenum, Comrade Yu. V. Andropov noted that it is necessary to assure the unconditional fulfillment of the plan, while at the same time taking advantage of all possibilities to overfulfill it.

It is feasible for this sector to make 1984 a year of ahead-of-schedule fulfillment of a number of important objectives set forth in the 5-year-plan for the oil and gas industry. This potential will be fulfilled, however, only if every collective achieves the ambitious targets set for them in the conservation plan for all types of resources, materials, raw materials and power.

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## PIPELINE CONSTRUCTION

### MINISTRY FOR OIL, GAS INDUSTRY CONSTRUCTION OUTLINES GOALS

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 2, Feb 84 p 1

[Editorial: "Maintain Current Tempo, Develop more Assertively Positive Trends in Efficiency Growth"]

[Text] Oil and gas industry enterprise builders, along with all the workers of our country have unanimously approved the proceedings of the December 1983 CPSU Central Committee Plenum, 9th session, 10th convocation of the Supreme Soviet of the USSR, as well as the extensive assessments and conclusions on the basic directions for the continued development of the national economy contained in the text of the speech by Comrade Yu. V. Andropov, General Secretary of the CPSU Central Committee, and chairman of the Presidium of the Supreme Soviet of the USSR.

The plenum noted that the national economy has made considerable progress. Our country is confidently moving along the path of economic and social progress. Nevertheless there still remain trouble spots and substantive shortcomings that will require a lot of work to eliminate. For this reason, as the CPSU Central Committee Plenum emphasized, "it is important to maintain the pace that has been achieved, the general orientation towards the practical resolution of problems, and to continually increase the sophistication of the party and state economic leadership and to develop more assertively the positive trends in the growth of efficiency, to give them a more stable character."

The USSR State Plan for Economic and Social Development and the USSR State Budget for 1984, both of which were approved by the USSR Supreme Soviet Session, along with the projects that were approved at the main December 1983 CPSU Central Committee Plenum corresponds to the economic strategy of the party. The plan and budget reflect the continued dynamic development and increased efficiency of social production, improved welfare of the people, and also provide everything essential to assure maintenance of the requisite level of defensive capability for the country.

The December 1983 CPSU Central Committee Plenum devoted considerable attention to the fulfillment of the USSR Food Program. The plenum classified the implementation of the USSR Power Program as a priority task. The extraction of crude oil and gas condensate in 1984 is to exceed the level of 1983 by 7.7 million tons, and of gas by 42.5 billion cubic meters. Western Siberia will remain the primary oil and gas base of the country. Pipeline transport will be developed at a faster pace.

A further increase in economic efficiency should be achieved in 1984. The primary emphasis must be placed on increasing the sophistication of management, accelerating research and development progress, utilizing more fully production potential, as well as all material, labor and financial resources. Priority importance, as the December 1983 CPSU Central Committee Plenum emphasized, must be accorded to strengthening of management procedures. At ministries and departments, at every enterprise, construction site, and facility concrete measures must be developed and implemented to reduce labor requirements, as well as the use of raw materials, materials and fuel and power resources.

The plenum also pointed out the necessity to pay particular attention to the improvement of the organization of construction work, the concentration of resources and equipment on projects that are nearing completion, the assurance of faster startups and of the incorporation of new production capabilities.

Based on this additional economic development and the achievement of high technico-economic indicators, the party will proceed conscientiously with the consecutive implementation of the social program for the 11th Five-Year Plan.

The CPSU Central Committee has called upon all workers of our country to spread socialist competition for the fulfillment and overfulfillment of the 1984 plan and the objectives of the 5-year plan generally. The plenum emphasized that under the conditions of the much more tense international situation that is the fault of the imperialist circles, the strict fulfillment of plan targets and highly productive work is not only an obligation but the patriotic duty of every collective and every Soviet man.

Collectives at all the subdivisions of Minneftegazstroy [USSR Ministry for Construction of Oil and Gas Industry Enterprises], having approved the proceedings of the December 1983 CPSU Central Committee Plenum and the 9th session of the USSR Supreme Soviet as their battle plan, and are searching for and activating the reserves in construction productivity in order to overfulfill the plan for 1984. One of these areas of underutilized capacity lies in the effective utilization of existing resources. Reducing outlays in this sector of material and fuel and power resources is the theme of the given issue of this magazine.

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GENERAL

MINISTRY OF GEOLOGY CHIDED FOR INADEQUATE UKHTA HOUSING

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 1 Mar 84 p 1

[Article under the rubric "Verifying the Performance of Obligations" by V. Sinenko: "The Path to the Treasure"]

[Text] The path to the treasure is being laid by the collective of the Ukhtaneftgazgeologiya Association, which has adopted a counter-plan to increase petroleum reserves 10 percent above the plan without additional appropriations. Is everything going smoothly on the path?

The ring of the taiga enclosed the oil well and several tens of little houses -- the watch settlement of geological explorers. Snow squeaks under the feet of assistant drilling foreman Boris Krylov and visible breath escapes from his mouth. But the collar of his jacket is unbuttoned. For local conditions it is not cold -- minus 20.

After 12 hours of work one watch is in the bathhouse. They are thrashing each other with branches and guffawing, looking forward to a substantial meal and sweet sleep. Fellows working under Anatoliy Chistyakov, one of the best drill operators of the Ukhta Oil and Gas Exploration Expedition, are carrying on their work. And the drill bit had not gone 2 meters before it was "eaten up" by the quartz sandstone.

The watch works in a well-ordered and fine way. A new drill bit and pipes for splicing it were prepared beforehand and tens of small things which save the watch time were taken into account. In a complicated operation 2.5 hours will be saved.

Having checked everything for faults, Krylov stood up, observing the fellows' activities with pleasure. More than one watch had finished its work in the same way. He was among those who gave the country its first Vuktyl gas and tamed the new oil wells in Komi ASSR. It is absurd, but he still cannot forget how he shuddered when, in a film about oil workers, he saw a gusher blow right on the rig. He almost fell off his chair -- it was a disaster, waste. But in the movie everyone was happy, dancing and washing themselves with oil. In life it is not that way -- everything is simpler and more austere. When a well is beginning its life, it is no time for dancing.

Like everyone else, he supported the association collective's counter-plan -- to increase oil reserves by 10 percent above the established annual assignment without additional appropriations. He also supported the general strategy of achieving high results not by number but by skill. In comparison with the past five-year plan, 12 drilling brigades have been eliminated while the volume of work performed has increased at the same time. Responding to decisions of the December 1983 and February 1984 Plenums of the CPSU Central Committee by work, the association is ahead of the depth drilling schedule for this year by 3,470 meters; labor productivity increased by 15 percent as compared to the planned level; the prime cost of geological exploration was reduced by 6.5 percent; and more than 1 million rubles worth of profit was received. Developing comprehensive target programs to increase drilling speed and reduce the accident rate, introduce the brigade system, and raise the level of discipline is promoting success.

One thing is disturbing: can oil rig installers and transport workers take the pace that has been set? What is the use of trying, if the drilling workers will have no place to move on to? The shapely drilling rigs do not appear of their own accord above the highest cedars in the impenetrable taiga, nor does everything necessary for normal work and life. And the main problem for oil rig installers is a great deal of manual labor. Krylov heard that association specialists were working hard on solving it; they went to Tyumen for know-how. Today the techniques of prefabricated construction, which makes labor easier and increases speed, is being assimilated. This is reassuring and, in its turn, prevents a cooling of enthusiasm.

I came down from the rig by a steep wooden ramp. In the freezing air the distant roar is easily distinguishable -- day and night powerful heavy-duty trucks move along the winter roads laid in the snow-covered taiga. From heavy piping and equipment to a tiny bolt -- everything is imported for the oil wells today.

An endless snowy corridor. The weather turned out to be beautiful; since early morning there was sun and no drifts, but one could not pick up a lot of speed in the cumbersome pipe trucks. Even though the road is smooth, it is narrow and has a lot of turns. From time to time Andrey Timofeyevich Ol'vanika looks into the rear view mirror. Is his partner falling behind? Everything is fine -- Leonid Shkarlet is also driving with confidence. Judging by everything, they will beat the schedule.

They have been on the trip for a week now -- they are hauling piping from a dismantled site to a new one. All the drivers have very little sleep these days. Today they arose at 0500 and were on the way immediately. The pipe trucks have been loaded since evening. The frost and the blizzard, the dry food and the disorder of their daily lives -- they endure everything as long as there is something to haul!

Once they turned off at drilling site No 12 to have a snack. There they met the chief of the rayon technical-engineering services expedition Petr Nikiforuk. The fellow was noticeably nervous. And how would one not be nervous if machine tools did not arrive in time from the Volgograd Drilling Equipment Plant and

the Uralmashzavod [Ural Machine Plant]. The suppliers' heads do not ache -- it is a long quarter. But here if you neglect even a day, it is as good as lost -- the winter road melts and that is it -- stuck in the swamps. Those who are not fulfilling their contract obligations should come here today -- the suppliers of pipe from Rustavi, Sumgait, and Dnepropetrovsk, chemical reagents suppliers from the Andizhan Hydrolytic Plant, and cement suppliers from the Zdolbunov Cement Plant. They would be roasted over a fire.

The last turn and a new oil well opens up . Having moved the taiga apart in a grand way, the well stretches upward so that in time, a little more firmly standing on its legs, it can begin its complex path toward underground treasures.

The secretary of the association apparat Komsomol committee Kostya Orel drives to the Geolog auxiliary farm with pride. Last year Komsomol members took over sponsorship of feed procurement. All summer detachments have worked and accumulated enough hay and silage, although under northern conditions this is not at all simple.

As soon as I got out the vehicle, a shaggy Eskimo dog threw himself under our feet and affably and joyfully wagged his tail. Eleven inhabited little houses and five which are ready to be inhabited look gay against the background of abundant snow and trees thoughtfully preserved by the builders. Seven builders and the first farm workers live here. Everything is done very well, to last a long time. There are 100 head of cattle in two cow-sheds. In the near future this figure will increase by 8 times. They will provide milk and meat for a dispensary and the worker families. Land must be won from the taiga -- land improvement work must be carried out. Today Kostya came with a fully determined purpose -- to set up a Komsomol youth brigade of carpenters. It appears there is everything here to do it. And the brigade leader Sergey Smirnov is young and sensible, with a harmonious and hard-working collective.

But we did not have a conversation this time. Many other questions arose -- about wages, the work front, and equipment supply.

At the beginning Kostya was pleased at how the people were making themselves at home there. Take that Veretennikov family. She is a calf-herd; he a carpenter. Their father came to visit them and put a furnace together. Although there is steam heat in the settlement, this is more reliable and sound. There are many kids everywhere; you can hear their voices. And who to leave them with and how their studies will go already worries the young parents. A kindergarten, a school, and other social-cultural projects are all needed not tomorrow, but today, now. Construction is in full swing. However, up to this point there is no necessary budget documentation. This complicates the work significantly and creates confusion.

Kostya voted with two hands for points in the socialist obligation on developing the auxiliary farm, building its housing, and improving the daily life of the geologists. He knows well what it means to come to a city after many days of watch and wander in strange corners, not knowing what to do with oneself. And with all his heart he rejoices in the persistence with which the Ukhta Expedition undertook to erect their three-story dormitory in-house. But

here is the trouble: although the third story is already being erected, at this point there is no necessary budget documentation. But after all the Komigrazhdanproekt Institute branch, which is always ready to help geological explorers, is not just anywhere. It is right in Ukhta. What is the problem then?

The response from Leonid Ivanovich Kostenkov, the chief of the association's capital construction department, made an unpleasant impression on Kostya: "We are proving to be an insolvent organization. The RSFSR Ministry of Geology does not assign the necessary limits for us for planning, and less than half of our requests are met. We can incorporate significantly more means than allocated by the ministry in contract construction as well."

Kostya listened, while in his eyes he saw the indignant brigade of Sergey Smirnov's carpenters and the familiar newlyweds, dreaming about a room in a new house which in no way can be planned at the present time.

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## GENERAL

### NEW AMENITIES IMPROVE OIL AND GAS WORKERS' LIVES

Baku VYSHKA in Russian 13 Dec 83 p 2

[Article by V. Yeregin: "For Builders' Daily Lives"]

[Text] No other country in the world builds as many ultralong oil and gas pipelines as the USSR. In this five-year plan alone builders are to lay 43,000 kilometers of gas mains. To a great extent shock work on this construction depends on how well the daily life of workers and engineers is set up. Specialists from several design and construction organizations are engaged in solving this question. They are demonstrating the best of their work in the Gas Industry pavillion at the USSR VDNKh [Exhibition of Achievements of the National Economy of the USSR].

The USSR Ministry of Construction of Petroleum and Gas Industry Enterprises' experimental design buro for reinforced concrete developed a design for a cultural-sanitation complex earmarked to conduct sports and mass cultural activities in field camps on underground pipeline routes which are under construction and in operation. The complex consists of a gymnasium, a swimming pool, and auxiliary areas. The gymnasium is for playing volleyball, doing gymnastics, table tennis and badminton, boxing, and weightlifting. Up to 30 people can be training at one time.

The swimming pool is intended for conducting health activities; its basin is made of rubberized fabric material, with a water depth that does not exceed 1.5 meters. Fifteen or 16 people may be in this pool at one time.

A club with an auditorium with 196 seats may be used for showing films, performances by amateur artistic collectives, and other measures. It is equipped with a film projection room, a broadcasting center, an artistic room, and other auxiliary areas. There is even a library with a 20-seat reading room and book storage for 3,000 volumes.

The complex can be erected in stages. Any building which is part of it can also function autonomously, since each of them is designed with its own life support system.

All the buildings are assembled from folding composite sections which are manufactured by the Serpukhov Construction Design Combine, the Oktyabr'skiy

Metalwork Plant, and the Soyuzneftegazstroykonstruktsiya All-Union Production Association.

A hotel complex designed for workers, technical-engineering workers, and foreign specialists at newly erected oil and gas industry projects is attracting the attention of specialists. It is a one-story building made up of container-type blocks that are fully plant manufactured, equipped with all life support systems. The Ministry of Construction of Petroleum and Gas Industry Enterprises Oktyabr'skiy Metalwork Plant is manufacturing it on individual order.

The building consists of two parts -- the residential and auxiliary parts, connected by a passage unit. The residential part has one-room apartments of 13.7 square meters each as well as a sanitation unit, a linen room, and a clothes drying room. The auxiliary areas include various storerooms, a power unit, and an air-ventilation chamber. The block designs envision connecting them with external energy supply sources and the sewage system. They are installed on standard pilings. This complex, which has a usable area of more than 300 square meters, may be operated in areas with seismicity levels of up to 6 points.

A plan for a cafeteria designed to serve 90 people may be examined in the pavilion exposition. This facility is assembled rapidly from two blocks developed on the basis of Uyt-type railroad car homes manufactured by the Volokolamsk Construction Design Plant. One of the blocks has a dining hall with little tables, a serving area, and an entrance hall with heat protection. The second block contains an area for preparing food, a storeroom, and refrigeration equipment.

The blocks of this dining hall are transported on carts and may be moved along the pipeline route. Special foundations do not have to be built to install them on; it is adequate to suspend each block on supports, thus taking the load off the rolling carts' springs.

The energy supply is to be from external sources -- a diesel station which is not part of the dining hall complex. A gas furnace with a cylinder is installed in the food preparation area in case of interruptions in the energy supply. Reservoirs which hold 2,000 liters have been installed under the roof to store water.

The Volokolamsk Construction Design Plant also manufactures a sanitation-domestic building designed for taking' sauna baths.

Other plans whose utilization will make it possible to improve the daily life of builders, oil workers, and gas workers significantly can also be examined in the exposition pavilion.

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## GENERAL

### WEST SIBERIAN CLIMATE RUINS OIL WORKERS' HEALTH

Moscow SOVETSKAYA ROSSIYA in Russian 9 Dec 83 p 3

[Article by V. Peskov, senior expert of the Interdepartmental Territorial Commission of USSR Gosplan: "A Specialist's Reflections on Problems of Adapting to the North -- A Difficult Climate"]

[Text] In the Novyy Urengoy airport I was an involuntary witness to the following scene. A young family was waiting for a flight to Bolshaya Zemlya [central zones].

"I'd never have given up an interesting job if they'd given us an apartment and you hadn't gotten sick," a young bearded man was saying to his traveling companion.

We had a talk. Two years before the newlyweds had arrived in the "gas" capital. He worked as an operator in the oil field while the wife was a kindergarten teacher. They lived in different dormitories. And then the disorder and the humid climate told on the wife. Every year tens of thousands of people come to work the oil and gas deposits. They come, knowing that a harsh climate and difficult work conditions await them. And many cannot adapt themselves. As research has shown, two thirds leave the North after living there for only a year, a certain portion of them because their health has begun to fail.

Our complex has no equal among the eight most important territorial-production complexes of the 11th Five-Year Plan. Only skilled workers are up to the challenges which face us. It is naive to suppose that they will be tempted by good wages. Today people frequently give preference to many social values, and they do not remember their health only when they find themselves in a hospital bed. It is no accident that at the June 1983 Plenum of the CPSU Central Committee Yu.V. Andropov talked about the need to insure a close link between economic and social policy.

It goes without saying that in recent years the construction rate of residential and social-domestic projects in the oil and gas complex has risen significantly. Other regions of the country have given help. In the last five-year plan alone 4.5 million square meters of housing was introduced, plus more than 20,000 places each in school and pre-school institutions, and about 2,000 hospital beds. But there are two figures which are cause for concern: in the

past 15 years 0.5 percent of all allocations in non-production construction has been allocated for the needs of the public health field. That is less than one-eighth of the norm. And here is what it has led to. Northerners are provided with half the number of kindergartens, nursery schools, general schools, hospitals, and polyclinics that are envisioned in the norms, and sometimes even less. And the means allocated are used inefficiently. Last year only one half the number of hospitals and polyclinics as compared to the plan were introduced. And it is no better today. The Glavtyumenpromstroy [possibly Tyumen Main Administration of Building Industry] has been building a hospital for oil workers for the past 10 years, and hardly more than one-tenth is finished. Construction on the important project has essentially stopped. In the Middle Ob region where, of course, the basic flow of Tyumen oil comes from, new settlements of oil field workers -- Lyantorsk, Radyzhnyy, and Langepas -- have appeared. There is every reason to suppose that they will receive the status of cities. But up to this point sick people go hundreds of kilometers to Surgut and Nizhnevartovsk: there are neither hospitals nor polyclinics in the settlements. The situation is no better in the young city of Noyabrsk, the center of a new oil extracting region. Of course, these institutions will appear in time. But this delay has extensive material and moral costs. And most alarming is the fact that some Union ministries, among them such "whales" as the oil and gas ministries, are planning these costs. In the 11th Five-Year Plan they are to introduce one half as many places in hospitals and polyclinics as are needed. This is the main thing that makes it impossible to work on preventive health care on a large scale, with a state orientation.

Normal development of the network of public health facilities is also impeded by obsolete standards. Planners begin from the assertion that 120 hospital beds are needed per 10,000 residents. Tyumen Medical Institute scientists confirm that the standard does not take into account that the oblast, the largest in the country, is in the northern rayons, which have a low population density; and moreover, tens of thousands of "flying workers" from other rayons live in its territory continually, which the statistics do not take into account. Therefore the standard must be raised to 180 beds. However, the planners of our cities and settlements are oriented as before to the old standard, even though there is an intermediate standard, at RSFSR Gosplan. It seems to us that it is time for the USSR Gosstroy along with the Ministry of Health to arrive at one opinion and to analyze other standards as well.

New methods of labor organization merit special attention: the watch and watch-expeditionary methods. They encompass 200,000 geologists, oil workers, and builders who are performing more than one third of the whole volume of work. Many questions accumulate here: how should efficient schedules of work and rest be selected, and how is a person affected by frequent changes in climatic zone and work in an autonomous collective? The Institute of Physiology of the Siberian Branch of the USSR Academy of Medical Sciences and the Tyumen Medical Institute are working on these problems within the confines of the "Watch" program. The first recommendations have appeared. However, "flying brigades" are rarely formed on the basis of medical-biological data. Moreover, a large number of the beginners in general do not undergo a preventive medical examination and arrive in the North in by no means the best shape. Is it at all surprising that they often get sick? In our opinion, it is high time to use a



precise system of selecting those wishing to work in the North. Nonetheless, scientists should also hasten to provide reliable tests for practical public health.

General sanitary measures, physical culture, and sports in the system for prevention of illness are special subjects for discussion. I will not go into detail, but I will note that there are few regions in our country where gymnasiums and fields are used as consistently, from early morning till late at night, as in our northern cities. And not only because the population there is very young and loves sports. The main thing is these facilities can be counted on one's fingers, and they are in converted quarters. And the ministers consider discussions about the need to build them to be almost frivolous.

Problems related to fundamental research lie in wait for us in preventing illness. Geologists have been working in the Polar Regions regions for a long time. Now builders, oil workers, and gas workers are arriving there. But major science studies all the features of human life and work in these latitudes primarily from the literature. Yamburg is perhaps the most vivid example. The development of this polar region gas giant has begun. But arguments on the labor regime of oil field workers are going on even now. The future city is being planned by a reputable institute -- LenNIIPGradostroitel'stvo [possibly Leningrad Scientific Research Institute of City Construction]. But there is not even a line in one document about how the preventive care complex will insure the people's health.

In Siberia there are scientific organizations which are capable of helping to solve these complex problems. One of these is the Novokuznetsk Institute of Comprehensive Hygiene and Preventive Medicine of the USSR Academy of Medical Sciences' Siberian Branch. It should give its share of recommendations within the confines of the target development program for the oil and gas complex until the year 2000. But the work is going very slowly. So far the institute has limited itself to one short expedition. Another, the Novosibirsk Scientific Research Institute of Hygiene, has become the center of a new research area -- hygiene mapping. In studying the natural-climatic conditions in the zones of Siberia, scientists are determining where and for how long a man may live and work without damage to his health. This scientific-research institute could also help Tyumen residents organize preventive health care work. But at the present time its associates are not showing much interest in our affairs.

Specialists in the physiology of labor must also study people's adaptation to the North. And they must know contemporary equipment. Tyumen University will graduate the first group of physiologists next year. But this is only a drop in the sea for West Siberia. Most likely, it would be worthwhile for the republic's Gosplan and the Ministry of VUZes to think about training them in other VUZes.

Tyumen residents are not sitting with their arms crossed hoping for help. The Interdepartmental Territorial Commission on Questions of Developing the Oil and Gas Complex under USSR Gosplan together with the USSR Academy of Medical Sciences' Siberian Branch has set up a research laboratory for medical-social

problems of incorporating the North in Surgut with branches in Nadym and Yamburg. At the present time the laboratory is only taking its first steps, but it is believed that we will not have long to wait for results. Intersectorial recommendations for preventive health care have already been worked out and are being introduced in the Surgutgazstroy and Surgutneftepromstroy trusts. The appearance of the laboratory has been noticed. Oil workers and gas workers have agreed to finance it on share principles. We hope that other sectors will follow their example. This will extend scientists' opportunities and make it possible to deal with complex tasks more quickly.

In our opinion, it is time to set up academic medical institutions in Tyumen as well. Can one medical education institute accomplish much? Today a branch of the All-Union Cardiology Center is being set up in the oblast center. At the present time it is the only one.

Man has come to the North. And our general concern, as they say, is to insure that his health is indeed Siberian!

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## GENERAL

### BUILDING HOUSING FOR FAR NORTH

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 4, Apr 84 p 29

[Article by K. Z. Zaynashev, Tyumengazorgtekhstroy, and V. V. Semerikov, Tyumengazprom: "Homes for Northerners"]

[Text] Tyumen Oblast gas workers are making an important contribution toward increasing the volume of natural gas extracted in the country. A large number of highly skilled specialists are being recruited to extract mineral resources in the West Siberia region. In connection with this the problem of providing the gas workers with comfortable dwellings and public buildings for spending leisure time is acquiring increasing urgency.

LenZNIIEP [Leningrad Zone Scientific Research Institute of Standard and Experimental Designs of Residential and Public Buildings] has developed a design variant of series 123 homes using claydite concrete. This series of residential and public buildings with comprehensive use of claydite concrete is to be used for construction on standard and permafrost soil with an outside air temperature of -40 to -50 degrees Centigrade.

The series designation envisions producing on a single technological line a whole set of objects of the design system for comprehensive housing systems in microrayons under Far North conditions. This includes residential dwellings of 2, 5, and 9 stories with regular face panels oriented by latitude and meridian.

Construction of buildings with paneled first floors where trade and public catering enterprises and dormitories will be located is also envisioned. There are nursery and general education school sites as well.

Thanks to the large number of diverse residential sections, different layout concepts with residential and staircase blocks and more flexible architecture in building certain microrayons are possible. The height of a story, three meters, increases the inside volume, creating increased comfort. Refrigerators are located in spacious kitchens with natural lighting, making it possible to save on electricity. Triple windows and better interior finishing are important as well.

In order to create diversity in the architecture of residential and public buildings, exterior wall elements are to be finished with textured compounds of white and colored cement and facing tiles.

In order to erect series 113-123 residential and public buildings with comprehensive use of claydite concrete, LenZNIIEP, in conjunction with TyumenNIIgiprogas [possibly the Tyumen Scientific Research Institute of the State Institute for the Planning of Gas Extraction] and Tyumengazprom [possibly Tyumen Gas Industry], has designed a large-panel home-building (KBD) plant in the settlement of Vinzili in Tyumen Oblast. The site for plant construction was chosen so as to provide direct delivery of raw materials from the claydite concrete gravel plant located nearby as well as to make it more convenient to cooperate with Tyumenpromstroymaterialy Production Association enterprises in supplying water and electricity and for other service lines. The future plant's technological scheme will insure the production of a complete set of assembly elements for 2, 5, and 9-story residential and public buildings. It is proposed that the plant produce a complete range of articles for residence dwellings, section blocks, and series 123 social, cultural, and domestic buildings, with the exception of the zero-cycle (foundations and pilings), which will be supplied by cooperating partners.

By contract with Tyumengazprom raw materials will be supplied in the following way: sand--by truck transport from local pits; gravel--by rail from Alapayevsk and Nizhniy Tagil; cement--by rail transport from Sukhoy Log; claydite--by belt conveyor from the Tyumenpromstroymaterialy Association claydite gravel plant as well as by truck transport from the settlement of Bogandinka; and reinforcement--by rail transport from Chelyabinsk, Dnepropetrovsk, Magnitogorsk, and Novokuznetsk. The Tyumenstroygazdobycha trust collective is performing the construction work. Construction of the first phase of the plant is to be completed in 1985. Soon the gas producers of the Tyumen North will begin to receive good-quality, comfortable, and attractive housing.

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## GENERAL

### 'PUSHERS' BLAMED FOR ENDEMIC SUPPLY PROBLEMS

Moscow PRAVDA in Russian 9 Apr 84 p. 2

[Article by B. Petukhov, chief of the West-Kazakhstan Main Territorial Administration of Kazakh SSR Gosstab: "Problems and Opinions -- Do Without the 'Pusher'"]

[Text] I have managed the territorial administration of material-technical supply for seven years. Our region is an interesting and furiously developing one. Aktyubinsk Oblast ships train loads of chromite and nickel ore. Oil derricks rise up in the deserts of Gurevsk and Mangyshlak Oblasts one after another. Ural residents are developing machine building and light industry. And of course no one can do without us, the supply workers. But the trouble is, our work is often understood narrowly: provide supplies, and that is that!

I remember the long, tedious negotiations we carried on with the Guryev Embanef't' Association last year. It requested calcium chloride from us and quoted calculations. When we, not without hesitation, supplied what was demanded, the oil workers themselves refused it. And after that, who could believe their arguments?

This year -- the same story. But now we thoroughly verified whether the order was substantiated. It turned out the calculations were very approximate once again. Ultimately, the association came to agree with our viewpoint and sent official confirmation.

This incident is by no means something very unusual. It is a completely common matter: their calculation was "on the off-chance." Isn't it precisely because ministries and departments have become accustomed to the harmless phrase "excessive norms of material resource expenditure"? I have flown over the sands by helicopter many times, and as many times there has been piping scattered around. Of course we are fighting against this: we mete out punishment and fines. But it is not so simple to bring order. At the end of last year the USSR People's Control Committee uncovered serious shortcomings in the storage and use of piping and other materials at the Embanef't' and Mangyshlakneft' associations. After that the oilmen began to straighten up. We should thank the controllers, but after all, inspection even the most painstaking inspection, is only an episode. But norms operate continually: for one meter of penetration in exploratory well drilling, 72 kilograms of casing pipe are provided, but they use only 55-69 in all. Norms are approved without

taking account of the extensive application of geophysical work. And after all, the scope and quantity of exploration and extraction in West Kazakstan is enormous.

Or take another painful question. There is never enough timber. However, in West Kazakhstan alone, there are 15,000 cubic meters of unused lumber waste annually. So then the problem must be solved from two directions -- produce an intensive plan for using all wood materials and reduce that part of them which consumers have never received. But then wood suppliers must, of course, unload everything else down to the last cubic meter. A strange practice exists today; USSR Gosplan develops a plan, knowing in advance that the plan for lumber shipments will not be fulfilled. It is now clear why the pusher ["tolkach"] is still around."

But just a minute, people object: isn't an enterprise interested in conserving resources and don't they receive bonuses or incentive? The question is a reasonable one. But the more one begins to try understand it, the more one is confused: the methodology for calculating economies is extremely complicated and frequently contradictory. And there are so many indicators! The unjustifiably cumbersome system leads to misunderstandings between different services and departments, and frequently reduces this important work to paperwork and formalism. What else does one call the "struggle for economy" conducted by the Kazakh SSR Ministry of Construction of Heavy Industry Enterprises. It did not send the annual economies assignment to its subdivisions until March.

Last year Mangyshlak Oblast did not fulfill its obligation to economize on boiler and furnace fuel, while Ural Oblast failed on lumber materials, Guryev Oblast -- cement, and Aktyubinsk Oblast -- metal. And although on the whole the region expended material resources more efficiently last year than the year before, there is cause for uneasy reflection.

It seems to me that assignments for economizing must be given only in comparison with the norms and limits of the planning year; then the plant and factory will calculate their reserves and outline limits and plans more accurately. If we understand the system of economy, it means eliminating the necessity of acquiring new reserves and the latest trip by the plant supply officer will not be needed.

This pattern is interesting: when a plant plays the role of consumer, its managers are extremely principled. In order to obtain what is needed, the whole "arsenal" is used: telegrams are lying on the table and the phone is ringing off its cradle. But then the time comes to ship out its output -- and where does the militance disappear to? Stock breeders have many complaints against the Aktyubinsk sel'mash Plant -- shearing equipment is late, and oilmen and geological explorers complain that the Guryev Plant imeni Petrovskiy is stalling delivery of special instruments. As an inspection showed, neither plant is poverty-stricken: much more output is hoarded in warehouses than needs to be shipped. What is the problem then? Why do "pushers" leave no stone unturned in receiving offices? As a rule there are tens of objective reasons but the meaning is the same: lack of concern and poor performance discipline.

And we, supply workers, did not show high principles and were not able to monitor and help enterprises fulfill orders.

At times all this intensifies regionalism. For example, West Kazakhstan has obtained nails and electrodes from the Dnepropetrovsk Hardware Associations No 1 and No 2 -- approximately one-third of the total volume of deliveries. However, we do not obtain them; we request them. The associations do not respond to either letters or phone calls; they supply primarily their own buildings and plants. And then they send "pushers" 3,000 kilometers in trucks. They consume fuel more than they deliver freight, and at times they return empty. Of the quantity allotted by funds we import 10-20 percent of the nails and 30-40 percent of the electrodes.

How paradoxical it is that with the existing difficulties in supplying above-norm stocks of materials and with above-plan shortages of equipment, equipment waste is being reduced slowly and sometimes even increases. Gosnab organs are trying to enlist them in the work but it does not always work out. It is very difficult, and at times impossible, for us to keep track of what is in plant warehouses. P. Mostovoy, the chairman of the Ukraine Gosnab, has proposed permitting exchange operations between enterprises, by-passing Gosnab representatives. I believe this is an intelligent proposal.

I will refer to an actual situation. One plant was looking for soda ash, another wanted to sell it. While they were getting in touch with Glavsnab representatives and filling out the documents the soda became useless. The opinion exists that changing the existing rules would open up loopholes for all kinds of machinations. But could it be the opposite: in receiving more privileges a plant's director and construction chief might begin to treat their obligations more responsibly? And would it not be unnecessary to send couriers and waste time composing different papers? When there is mutual agreement, the state's interests do not suffer.

It seems to me that we Gosnab representatives will be guarding the state's interests if we focus our attention on problems of supplying the region as a whole. In point of fact territorial organs of supply were singled out from the sovnarkhozes. As is well known, these councils fulfilled their function and were reorganized. But now when we speak of territorial-industrial complexes, there is certainly reason to examine an old experience more attentively. I will explain with an example.

The Uralsk Fittings Plant imeni V.I. Lenin is located in West Kazakhstan. This plant produces valves for sanitary engineering equipment, which are in short supply. However, Uralsk now produces hose valves as well, and above and beyond the plan. Production capacities are used for a purpose other than the one designated simply because these hose valves are more expensive. And as a result, a line is being formed in the director's office and tens of consumers cannot obtain the other valves. And the plant representatives send hose valves to all corners of the country and are looking for markets.

What are we to do? Of course, we fine the plant. And it continues to produce hose valves which no one needs. Our own USSR Ministry of Chemical and Petroleum Machine Building welcomes this initiative: it is profitable.

I believe the time has come, if only on the level of an experiment, to give Gossnab organs the right to suspend production in the state's interests. It is complicated to do this now: the enterprises receive part of the material-technical resources directly from the ministry. Frequently they receive more than they need -- as in the case of piping referred to above. Or what is needed is not produced, as is occurring at the fittings plant now.

A supply worker is a person who can manage to get everything, an experienced colleague once drove into me, a green engineer. Unfortunately, this view of our occupation is fairly widespread even today. We must be done with regionalism and narrow-minded departmentalism in the supply industry and put unrealistic plans in order; after all in practical work they lead to large expenditures, both material and moral ones. And then the supply worker will prove that he can do a great deal.

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GENERAL

JOB LISTED FOR WORKERS IN ENERGY FIELD

Moscow STROITEL'NAYA GAZETA in Russian 20 Nov 83 p 4

[Article: "Invitation to Work"]

[Text] Atommash Production Association imeni L.I. Brezhnev

Specialists who have higher education and work experience in industrial and civilian construction sites for positions of division chief and buro chief, senior design engineers, design engineers, architects, geodesists, economists, estimate specialists, and book-keepers.

Labor payment according to standard schedule.

Living space for those having families is made available on a priority system and unmarried persons are put in a well-appointed dormitory upon arrival.

Send an individual personnel records sheet and a copy of the labor booklet certified by the most recent place of work to: 347340, Volgodonsk-13, Rostov Oblast, Atommash Production Association imeni L.I. Brezhnev, Personnel Department.

Kasimov Open-Cut Mining Administration

Crusher operators, hammer mill operators, fitter-repairmen, and fitters of control and measuring instruments and automation equipment.

Persons not having an occupation may acquire one in courses with or without leave from production.

Unmarried workers and those with small families who are accepted for employment are provided with dormitory quarters, and will be given an apartment within a year in the settlement of Akshinskiy Kar'yer.

Send an individual personnel records sheet and the labor booklet to: 391330, Ryazan Oblast, Kasimov, Lenin Square, 1, Kasimov Open-Cut Mining Administration.

Nizhnevartovsk Petroleum Road Building Repair Trust

KrAZ-256B dump truck drivers, truck crane operators, excavating machine operators, self-propelled grader operators, self-propelled scraper operators, asphalt spreader operators, asphalt concrete equipment operators, 4th-5th class motor vehicle and tractor repairmen, auto electricians, and engineers and technicians in repairing and operating road-building and automobile and tractor equipment.

Labor payment is piece-rate and time-plus-bonus. The rayon coefficient is 1.7. After each year a 10 percent Northern supplement is added. Route costs are paid.

Unmarried persons are offered a place in a dormitory and family housing is in watch settlements within a year.

Write to: 626440, Nizhnevartovsk, Tyumen Oblast, Nizhnevartovsk Petroleum Road-Building Repair Trust, Personnel Department.

Departure for the job only with a summons.

Novourengoy Installation and Set-Up Administration

Gas and electric welding operators, drillers, electricians, electrical installers, installers of industrial buildings and constructions, construction trade workers, pipe-laying machine operators, and bulldozer operators, as well as specialists for the positions of supervisor, senior supervisor, set-up engineers for electrical equipment, foremen, drillers, and head mechanic.

The 1.7 rayon coefficient is added every half year -- the Northern supplement is 10-60 percent, and then up to 80 percent every year. An additional vacation of 18 working days is offered.

Those accepted for the work are provided with a place in a dormitory.

Write: 626718, Tyumen Oblast, Novyy Urengoy, Nadym'skaya Street, 7, Novourengoy Installation and Set-Up Administration.

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